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February 1990



Radio Control CAR ACTION

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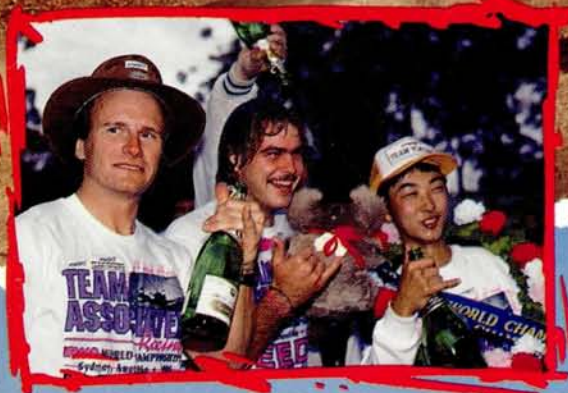
THE WORLD'S PREMIER R/C CAR MAGAZINE

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**PROJECT
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GLOBAL INVASION!
AUSTRALIAN WORLD CHAMPS



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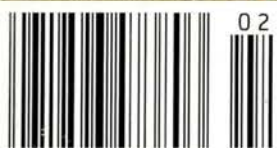
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NR/CTPA

PIT
CREW:
JON
SHERRY
MARK



FIRST LOOK:
Tamiya ASTUTE





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ON THE COVER: Top and inset: 4WD action during the IFMAR World Championships, and Team Associated/Team Yokomo celebrating victory in both 2WD and 4WD (photos by Rick Houle). Bottom: Some wild truck-pulling action with the Midnight Madness modified puller (photo by Dave Sproul). Top right: Neil Schindler's Concours-winning Tide Grand National car at the King 8 Supernationals (photo by Steve Pond).

EDITORIAL

by RICH HEMSTREET



THERE'S A NEW DRIVER at the wheel, but we're still traveling down the same road—only faster! This month, we feature race reports from around the world. First, Rick Houle is back home and has given us in-depth coverage of the IFMAR Off-Road Worlds from Australia. Just before Houle left for down under, he sent a report on the NORRCA Dirt-Oval Nationals. Steve Pond raced at and covered the King 8 Supernationals in Las Vegas. (Smitty had a better weekend behind the camera than behind the transmitter!) Finally, we sent Dave Sproul to Machesney Park Raceway in Rockford, IL, to cover the *Car Action*-sponsored QSAC Nationals.

We welcome three new writers on board this month: Jim Dahl gives us a sneak preview of Tamiya's new Astute; Lou Andreko reviews the Inter-Fab Viper Pro-10 on-road racer; and Bill Henning takes a look at WCM's Supermodified.

Just so you know a little bit about me: I've been racing R/C cars for about eight years. My first car was a second-hand Associated RC12E. Before getting into R/C racing, I was briefly involved in full-scale stock-car racing, until I couldn't afford it anymore. Before that, I spent time racing slot cars in several scales. I'm still a fan of full-scale auto racing, and I try to see as many races as I can.

We're currently planning our 1990 race coverage. We want to hear from you about the big races you're organizing this year. Mail us the flyers, fax us the facts—we want to hear what's going on! As soon as you have definite plans, drop us a line so we can make out our schedule and let you know ahead of time where we'll be.

That's all for this time. I'll catch you next month when we cover the conclusion of *Car Action*'s East-West Shootout. ■

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LETTERS

WHERE TO WRITE TO US

If you're writing to the editors (and we'd love to hear from you), please be sure to address your letters to "Letters," *Radio Control Car Action*, 251 Danbury Road, Wilton, CT 06897. Only subscription orders and inquiries are handled by our Customer Service Department in Mount Morris, IL; other mail addressed there must be forwarded to Connecticut, which leads to long delays.

The Eagle Has Taken Off

In the Ultima Pro Track Report in your November '89 issue (page 92), you said that the Ultima Pro has gold shocks, but in your review, you said they were aluminum, oil-filled, coil-over shocks. Why is this? Does the "gold shocks" mean "gold anodized"?

JOEY WIDENER
Huntsville, AL

Joey, the "Eagle Eye of the Month Contest" is no more. As your eagle eyes have

surely noticed, there was no "Eagle Eye" in the January '90 issue; for the new decade, we've decided to become a "kinder and gentler" magazine. Can't you just see the thousand points of light? We'll probably come up with something else to generate tons of mail, but don't ask me what it will be. Get back to me in about 1999!

I really hope you're kidding, Joey. The gold refers to the color of the anodization, not to the material used for the shock itself. Shocks are expensive enough as it is; could you imagine the price of solid-gold shocks?! WD

Apples and Oranges?

I enjoyed reading about the JR-X2 and RC10 competition in your November '89

issue. The attempt to keep radios and motors the same was honorable, but it was still a job of comparing apples and oranges, and I feel that your article was biased.

You chose to compare the graphite JR-X2 with the aluminum RC10, and this gave the JR-X2 a 2-ounce advantage. A more equitable competition would have been one between a graphite RC10 (available for a while) and the graphite JR-X2. So much for heats 1, 2 and 3. Instead of changing drivers for the final heat, why didn't you change the rear tires so that they, too, were matched and equal?

W. KENNETH LIDMAN
Woodbridge, NJ

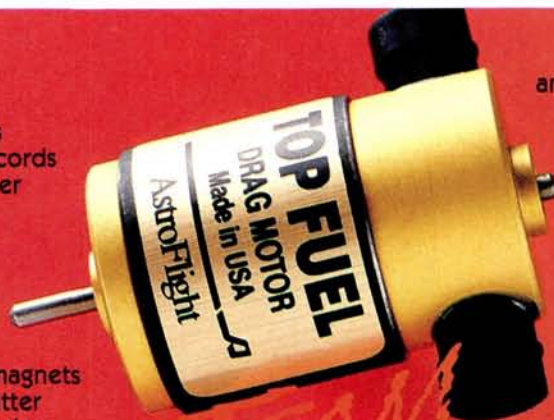
W. Kenneth, your letter is an example of

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Marina Del Rey, CA 90295

a rash of letters we've received since the RC10/JR-X2 shootout ran. This really boggles my mind! We've been getting letters clamoring for a shootout since the JR-X2 first appeared over a year ago. We finally get all the pieces together and do what many of our readers wanted us to, and suddenly, Car Action is biased!

The fact is, when the shootout was put into the works, the RC10 Graphite wasn't available; in fact, no one was even sure that the car would ever be produced. The suggested retail price of the two cars (RC10 kit no. 6016 and the JR-X2) differs by approximately \$10. This is hardly comparing apples and oranges! It's not as though we compared a Tamiya Grasshopper with the JR-X2; we compared two competition-level, off-road cars with very

similar prices. The original tires remained on the cars because we wanted them to be as close to stock as possible. The fact that the tires on the JR-X2 worked so well isn't our fault.

Many people seem to be offended that the tried-and-true RC10, in its old form, is no longer the king. Times change, and so do product trends. Now, Associated has further developed its car, and with the introduction of the RC10 Graphite, the competition should even out again.

WD

Used-Car Blues

I just bought a secondhand RC10 and wonder if this was a good idea. I really like the car, but I'm having some problems. Also, my A-arm cracked. When I

charged the battery pack it came with, there was a loud bang that sounded as if somebody had fired a cap gun in my ear. My friend said I blew a cell, but I really want to know, because my car doesn't run well. Great mag, dudes!

SHAWN HUME

Sherwood, P.E.I., Canada

Shawn, just as when buying a used full-size car, you must be extremely careful with R/C cars. Granted, you won't lose your life if your RC10 malfunctions, but you do open yourself to problems. Make sure the price you pay is a fair one, because a used car is a good way to get into R/C without spending big bucks.

For your particular situation, the

(Continued on page 10)

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LETTERS

(Continued from page 9)

cracked A-arm can be easily replaced. As for the battery pack, it does sound terminal. I think your friend was correct (the cell is probably blown), so unless you have some spare cells to put in, you're in for a new pack. WD

Smoked the Controller

Is it possible to mount Clod Buster tires and rims on the Big Brute? In one of your issues, they were mounted on a Double Dare. Also, my Boomerang has a Twister 4WD Ultra Stock motor in it. Occasionally, I put it (along with a 16-tooth pinion gear) in my Big Brute. It works fine, but the speed controller burns up. My friend has the same motor, pinion gear and truck, but with an electronic speed controller, and his works well. I was considering buying an Altech PK122. I don't plan to race, so I want reverse. Is this a good choice? Keep up the good work!

DEL FERREE
 Brownsburg, IN

Del, to mount Clod Buster rims and tires on your Big Brute, adapters are available from One Stop Hobbies (38655 Ann Arbor Rd., Livonia, MI 48150). As for the problem with your speed control, you're over-gearing, and this results in speed-control burnout. The Big Brute comes stock with a 15-tooth pinion gear that's attached to a Mabuchi 540 motor with 0-degree timing. The Twister motor you switched to has much more power than the Mabuchi motor, which requires a smaller pinion. The larger pinion you went to will cause the motor to draw much more current and, ultimately, will burn up the original speed control. Try a 12- or 13-tooth pinion on your Brute. The speed control you mentioned would be suitable for your Big Brute with the Twister motor, provided you have it geared properly and you stay away from the hot modified motors. SP

Two-Speed and a Slingshot

In your October '89 issue, you showed Nova's modular 2-speed tranny. Is there any way of getting one? Any information

would be helpful.

Also, does the Kyosho Slingshot have diffs, or straight axles like the Dominator? Will it run with the Dominator?

MIKE WILLIAMS
 M&M Racing, Bradenton, FL

Mike, I've found a company that advertises the Nova tranny you seek. It's Hobby Etc., Inc. (295 Daniel Webster Hwy. So., Lamplighter Square, Unit 3A, Nashua, NH 03060).

Like the Custom Works Dominator, the Kyosho Slingshot has no differential, just direct drive. Both cars use dogbones, not straight axles. Will it run with the Dominator? We'll see. Look for a full review soon in Car Action. After that, we'll probably do a shootout between the "New Car on the Block" and the established force. Keep your eyes open!

WD

Yes, Mom...The Optima Can Run In The Dirt!

I live near a large open field that has some pretty deep sand, but there's also an unused area that has been flattened out for new housing, and it isn't being used at this time. The hilly lot has hard-packed dirt that makes a pretty good off-road track. I currently have an RC10, and all my friends have Turbo Optima Mid SEs. I'm looking for a 4WD car with which I could beat them. They have Trinity Godzilla motors and Novak NESCT4. Can you tell me what equipment and car I'd need to beat them, or at least to be competitive?

One last question—from my mother: Can R/C cars be driven in the aforementioned conditions? Please answer me so that I don't get a lecture every time I drive my car there.

BRANDON COLLINS
 Santa Maria, CA

Brandon, I think the way to beat your buddies is to be on the same level with respect to your equipment, and then to become a better driver. I'd get the same car and running gear, so that no one has

(Continued on page 12)

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LETTERS

(Continued from page 10)

any excuses. You'll become a better driver by racing against them—and sneaking away to practice on the course while they aren't around!

And Mom, Brandon is allowed to race his car on the hard-packed dirt, but if you find any sand on the car—GROUND HIM!

WD

Screw-Up In Stafford Springs

Your magazine is cool, but your July '89 issue had an article about the New England Indoor Oval Championships and it didn't say who won 4th place in the A-Main Stock Off-Road Cars. Who won the IFMAR Off-Road 2WD Main?

BRIAN FRENCH

Roscoe, IL

as long I use stock motors, so could I use Trinity Monster Stocks?

KARL KEMP JR.

Stamford, CT

Karl, because the Double Dare uses the same chassis as the Kyosho 2WD trucks, the linkages are all interchangeable. All the 2WD trucks use 2WS. By using the steering assembly and rear linkage components that hold the rear wheels, you can do away with the steering rod that's giving you so much trouble. As for the speed control, the MC111B should be able to handle the loads of most stock motors, including the Trinity Monster Horsepower Stock, provided you gear properly.

SP

Plastic and Polish

I recently purchased a Clod Buster and am wondering about two things. One: Could you tell me how long I could run my Clod on the stock plastic bushings without tearing up anything until I can get some ball bearings? Two: I read Steve's "Project Clod Buster" often, and just about know it word for word. What kind of metal polish he used on those beautiful Sees wheels to get them so shiny? I have a set of those Sees and use stainless-steel polish, and it just doesn't cut it. A new R/C enthusiast,

MIKE GRAHAM

Mike, how long the stock plastic bushings will last depends a lot on what you plan to do with your truck. If you keep it clean and lubricated and you don't plan to beat it too badly, they could last for some time without drastic effects. On the other hand, if you're sled pulling or running your truck in a way that promotes wear, the plastic bushings could wear out in as little as a week or two.

As far as the Sees wheels go, they come with a pretty smooth, shiny finish right out of the box, but I took it one step further and polished them with Never Dull metal polish, which is manufactured by the George Basch Co., Inc. (Freeport, NY 11520). This polish has been used for

Brian, you may not believe this, but I was up at K/N RC Speedway in Stafford Springs, CT, last weekend for a race, and who do you think caught up to me but Scott Sauro, the 4th-place finisher in the A-Main for Off-Road Stock. He made me aware of this oversight, and the fact that his name is spelled Sauro, not Savro. Scott drove a JR-X2 with a Parma Mud Bus body.

Speaking of K/N, most people will be happy to know that the owners of the track have come into line with ROAR rules to make it easier for racers from out of the area to compete at their events. Bravo!

Look for a full report by Rick Houle on the IFMAR Off-Road World Championships in this issue.

WD

Less Steering, More Power

I have a Kyosho Double Dare that I'd like to convert to 2WS. I've attempted this twice, without success. The first time, I cut the steering rod that connects the two steering blocks and tried to glue it to the cradle in which it rests, but it worked loose. Then my dad put copper wire through two little holes on the rear steering block, but there was too much play. Also, I put in a Futaba MC111B electronic speed control; Kyosho said I could use it

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PUBLISHER'S PAGE

by LOUIS V. DeFRANCESCO JR.

years in the boating industry, and it works wonders with aluminum. It can brighten the shine on new material and restore the shine to older material. You could say I'm happy with how it works. Later, dude!

SP

"Clutsy" Clod

I own a Clod Buster and wonder if lifting it with a lift kit would make the wheelbase shorter and enable it to make better turns.

ART BROUSSEAU III
Cranston, RI

Art, a lift kit won't shorten the wheelbase at all, even though the increased height of the body may make it look shorter. Also, the higher center of gravity created by using a lift kit might make the Clod Buster more likely to tip over.

WD

Did Someone Get the Number of that Dremel?

Steve, I enjoyed your article on the RC10 Torpedo. Would you please give me the number of the Dremel Moto-Tool rubberized polishing wheel that you used on the tranny gears?

FOREST PETRUS
Ames, IA

Forest, I'm sorry I forgot to mention the number. The polishing wheel you're looking for is Dremel no. 425. The face of the wheel is actually flat, so I use a grinding stone to fit the angle of the teeth in the transmission. Get a couple of them, as they wear quickly and may not last through all the gears in the transmission.

SP

I'VE JUST RETURNED from the Radio Control Hobby Trade Associations' Chicago show held at the O'Hare Expo Center, and I can report that the radio-control hobby is still growing—as evidenced by the sea of enthusiastic consumers who attended (over 20,000).

At our booth alone, we gave away 22,000 magazines! These RCHTA shows are the first professionally promoted and managed shows ever put on in this industry, and they will contribute greatly to future growth. All the manufacturers I talked to were ecstatic about consumer response and the overwhelming number of attendees.

There are two more upcoming RCHTA shows: in Southern California at the Los Angeles County Fairplex in Pomona, March 8-12, and in Philadelphia at the Civic Center, May 3-6. If you live in either of these regions, I urge you to attend; the shows are great places to see all the latest in R/C and to fraternize with other modelers.

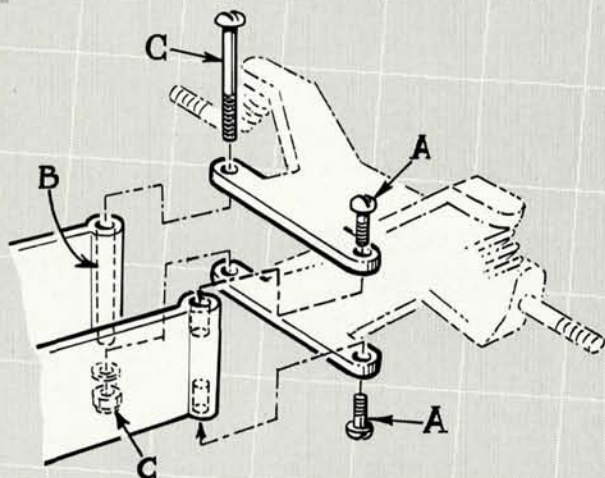
During this year's Chicago show, I was able to present Kyosho's President, Mr. Suzuki, and Hobbico's Vice President, Alan Green, with our 2nd Annual R/C Car Action Magazine "Car of the Year" Silver Cup. As you'll recall, the Kyosho Optima Mid SE took the honors in '89. As for '90, well, stay tuned—the competition looks fierce!



Alan Green (left), vice president of Hobbico, and Mr. Suzuki, president of Kyosho, are presented Car Action's "Car of the Year" trophy by Louis DeFrancesco at the Chicago Hobby Show.

PIT TIPS

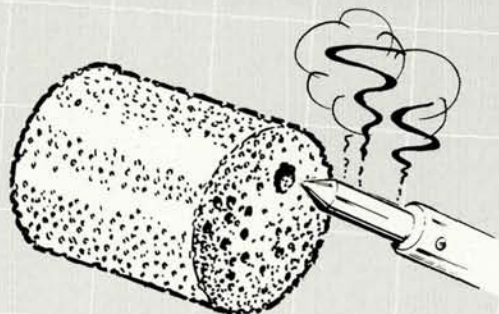
by JIM NEWMAN



FALCON CHASSIS STRENGTHENING

Screws sometimes break out of the posts where the front-suspension assembly joins the chassis because the four screws (marked "A") concentrate stress at the top and bottom of the posts. This owner carefully drilled through the posts from top to bottom (B), then used 1 1/2-inch-long hardware nuts, screws and washers (C) to cure this.

Chris Rahm, Leamington, Ontario, Canada



CUTTING HOLES IN FOAM

If you put foam dust covers over your motors, here's a way to cut neat holes for the motor wiring: Simply use a pencil-type soldering iron to make a hole in the foam.

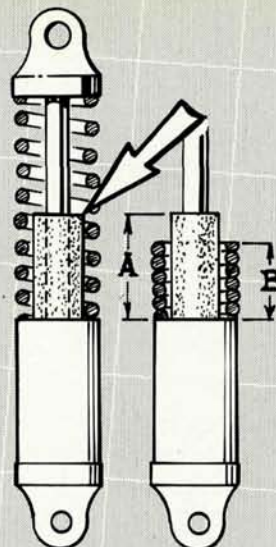
Paul Zehler, Buffalo, NY



WHEEL BALANCING

After fitting bearings to his wheels, the lack of balance was obvious, so our contributor resorted to silicone-gluing a 5/8-inch-long, 30-amp fuse to the inside of the wheel! Ordinarily, small squares of duct tape are sufficient to correct any imbalance, and from auto-parts stores, you can buy adhesive-backed lead strips from which small pieces can be cut.

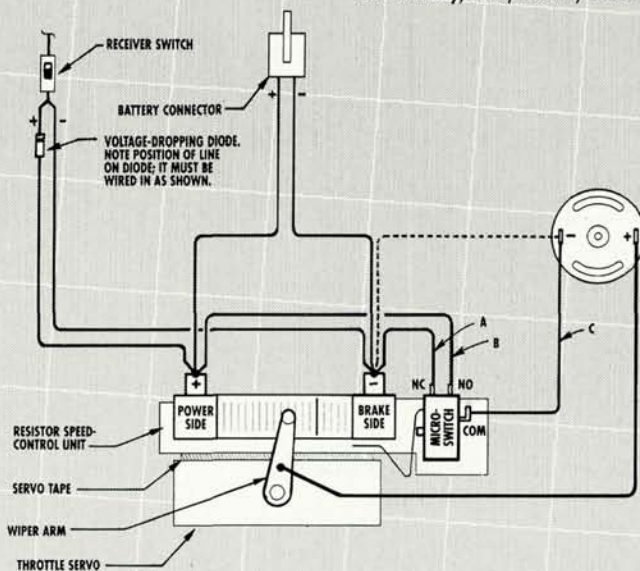
Sheldon Christianson, Hendon, Saskatchewan, Canada



DOUBLE-DARE BUMP STOPS

Going over big jumps, Sean noticed that his shock units bottomed out with a crash. To soften the impact, he slipped a piece of surgical rubber tube over each piston rod. Notice that the tube is longer (A) than the fully compressed length (B) of the spring.

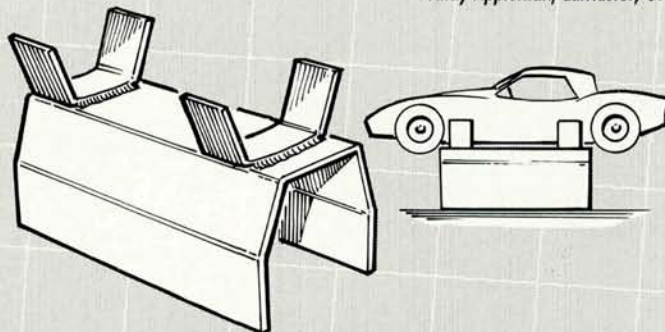
Sean Canady, Paris, Ontario, Canada



SIMPLIFIED PARMA RESISTOR DIAGRAM

Thanks to Andy, we have a less confusing diagram for the Parma variable-speed resistor unit. Shown here, it provides for reverse, but to eliminate this feature, you should omit the microswitch and wires A, B and C, and make only the connection shown by the dotted line.

Andy Appleman, Lancaster, OH



PVC CAR STAND

If you have a surplus piece of PVC gutter, you can make this very effective car stand. Assemble it with PVC pipe cement, silicone glue, or thick CA. You might need to line the U-shape pieces with foam rubber or felt.

Mike Grohall, Elkhorn, WI

(Continued on page 18)

READERS' RIDES

Welcome to Readers' Rides. This is our way of giving recognition to the unique, innovative—and sometimes bizarre—vehicles that our readers have created. If you want to join the growing ranks of Readers' Rides winners, send us a sharp, uncluttered, well-exposed color photo (no Polaroids, please!) of your car or truck, along with a brief description. Who knows? The Ayatollah of Radio Controlla might pick your car.

If your ride is chosen, you'll receive a one-year subscription to Car Action, or we'll extend your existing one. You'll also be eligible for the second annual "Readers' Ride Car of the Year Contest" in the fall of 1990. Send your photos to Readers' Rides, R/C Car Action Magazine, 251 Danbury Rd., Wilton, CT 06897. Be sure to include your address and phone number, in case we need to contact you!

BANDIT BRIGADE

Bryan Howel Jr. of Oswego, NY, sent in this photo of his fleet of cars. Bryan is a Harry Gant fan—as if you couldn't guess from the Skoal Bandit paint jobs on most of his cars! The fleet includes three RC10s, a Yokomo YZ-10, an MRP Pro-110, two MRP GP-10s, a Bolink Invader and a Hot Trick Sprint Car. Who knows? Maybe Bryan will start his own rent-a-ride program!



graphite chassis, bellcranks, and rear trailing arms; MIP transmission; Trinity Road Beast motor; Futaba 1.11B ESC; titanium dogbones; and de-anodized shocks.

NO AIRBRUSH HERE

Robert Jordan of University, MS, is here to show that you don't need an airbrush to achieve a nice paint job! His Toyota Stadium Racer's nifty body was painted with Pactra brush and spray paints. The McAllister body sits atop an RC10, using an Andy's Conversion Kit. The list of goodies for this hot number includes: Pro-Line tires; Sees rims; Houge

MOTION COMMOTION

The credit for the great paint job on this JR-X2 from Reseda, CA, should go to Lynn Masuda's uncle, who's a graphic designer. Lynn's JR-X2—called Local Motion—sports a Tekin ESC and a Twister Hurricane motor. Lynn, make sure you give our regards to your uncle, and don't forget to share your free subscription with him!



NOT JUST ANOTHER SIX-WHEELER

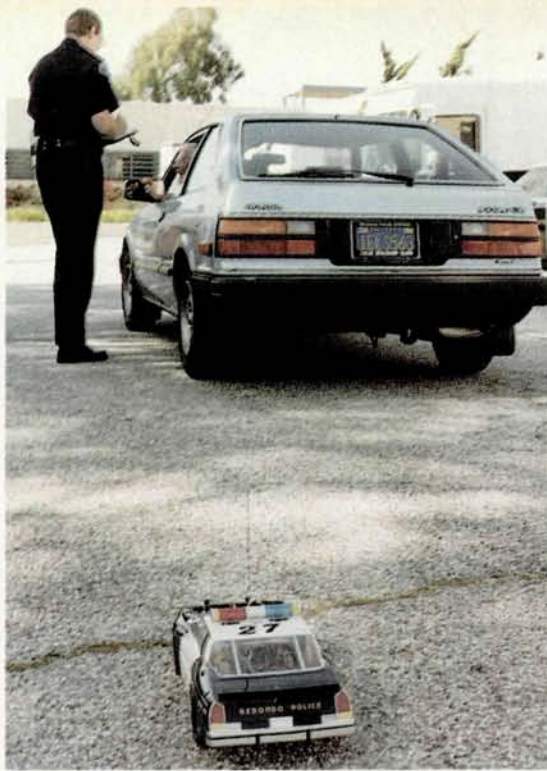
"Riptide" is the creation of Bob Nelson of Euless, TX. Just some of the features of this sharp-looking amphibious vehicle are: a balsa body covered with fiberglass; six Lunch Box wheels and tires; Grasshopper/Hornet rear ends with custom disc brakes; stainless-steel drive chains; and 16:1 gear ratio. The 6 1/2-inch-high Riptide has an overall length of nearly 23 inches and an overall width of 11 1/4 inches. It's at home on land or in the water; apparently, a propeller kicks in when this baby hits the water. You may see Riptide in a future article.





ON PATROL

The inspiration for Stephen Atwater's police car came from his nephew David. David and his wife, Diane, are both officers in the Redondo Beach Police Department, and this car is a replica of the "black-and-whites" used by that Californian community. This Yokomo in disguise features a 3-channel radio that controls the three-way siren, flashing light bar and operating headlights and taillights. It seems that the department's budget has shrunk, and that's why it can only afford 1/10-scale squad cars. Our question is: How does the officer fit into the car?



NOT FOR SALE IN THE U.S.

This Reader's Ride came all the way from Malaysia! This great shot shows Kew Sau's Optima Mid Custom Special in action. The car uses a KO Propo EX-5 radio, per Vortex speed control, Kyosho one-way differential and a Reedy motor. Kew points out that the instructions mention that this long-wheelbase version isn't available in the U.S. If it were sold here, we've no doubt it would be called the "Turbo Optima Mid SE SCCA Custom-Special Limited NBA Celebration Long-Wheelbase 'D Car'."

IT'S WHAT'S INSIDE THAT COUNTS

Dave Anderson of Federal Way, WA, had plenty of time to detail this Coors Thunderbird. He bought the MRP body while he was saving up for the rest of the car, which turned out to be a TRC Pro-10. As Coors decals are hard to come by, Dave used the old "electrician's-tape-and-razor-knife" trick to make all the decals and numbers, except the small sponsor stickers on the fenders. The mesh vents in the front of the body add a nice touch.



The real work, however, is on the inside. The interior is a "for sale" sign that he cut up and painted; plastic straws were used for the roll cage. As you can see through the window, scale aircraft gauges make the interior look quite realistic. This is Dave's first attempt at painting a car body; I can't wait until he's had time to brush-up on his technique!

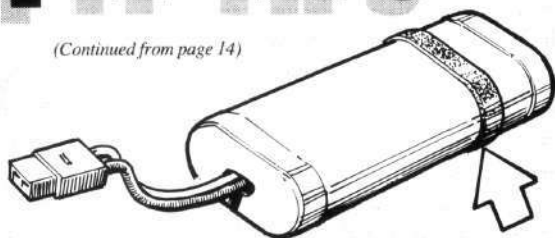
CUSTOM CLOD

Jacquel Thomas of Passaic, NJ, wrote that "the list of accessories is so long, I'll add what you can't see." His Clod Buster has working headlights and fog lights, Trinity-Clod motors and a Diamond bed cover. The eye-catching color scheme is picked up by the color-coordinated dual shocks on each corner. Just let your eyes wander over this one, and you'll be able to pick out all sorts of little details. Nice job Jacquel!



PIT TIPS

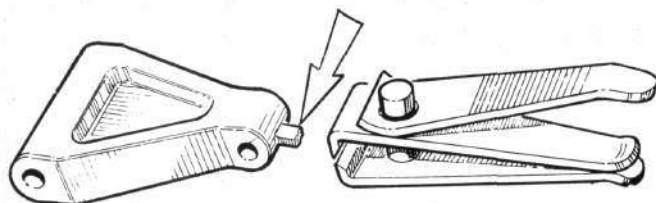
(Continued from page 14)



FLAT BATTERY I.D.

Why didn't someone think of this before? When you have multiple packs and remove a discharged pack from the car, just slip a rubber band over it to show that it's discharged. After charging, remove the band to show that it's ready to go. Brightly colored rubber bands are readily available.

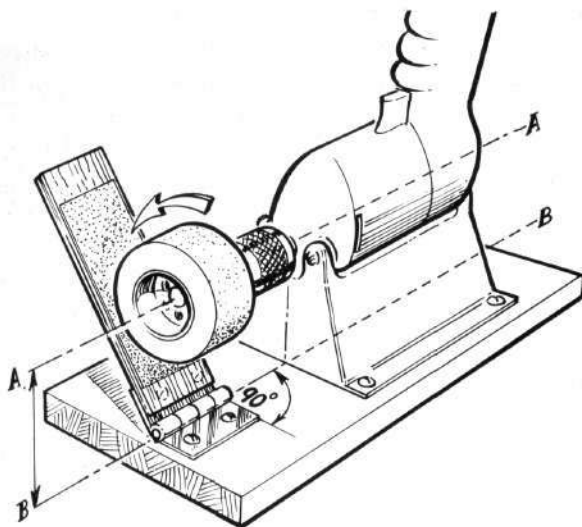
Scott Rapoport, Buena Park, CA



TRIMMING MOLDED PARTS

Instead of slicing and filing, try using nail clippers to remove flash or molding gates. Dan says they trim flush and "clean as a whistle."

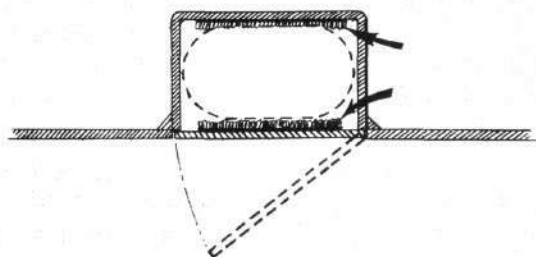
Dan Tan, Scarboro, Ontario, Canada



TIRE TRUING

This is a great little device for truing tires. If you don't have an inexpensive drill stand, use a vee-shaped block of wood and a large hose clip. Sandpaper boards of various grits are made up, using a progressively finer grit to finish. For really true tires, be sure axis A-A is parallel with B-B and that the hinge is at 90 degrees to B-B.

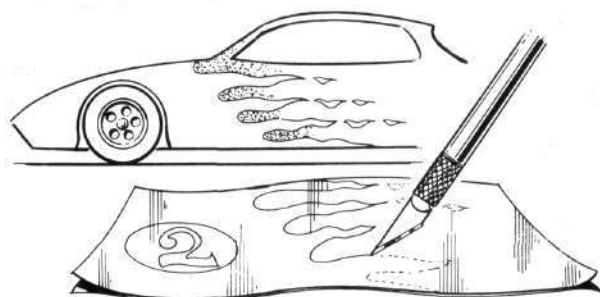
John Campbell, Byesville, OH



SILENCE THE RATTLES

On the jumps, Jeff's Blackfoot emitted some thumps and rattles that turned out to be from the battery pack. He cured this by using the furry side of pieces of Velcro (felt or sponge rubber will also work).

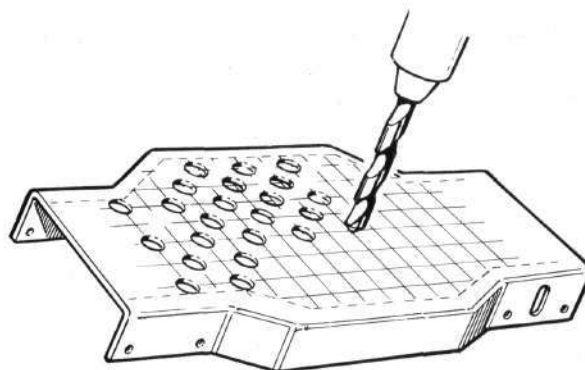
Jeff Pieper, Strasburg, IL



EASY MASKING

Instead of using masking tape to mask off intricate designs, obtain a length of transparent, self-adhesive, low-tack, shelf paper. Lay out the design on paper, lay the shelf paper over this, then trace and cut using a new blade. Large areas can be masked quickly in one piece instead of using lots of tape pieces.

Joe Klassen, Forest City, NC



WEIGHT REDUCTION

If you're careful, you can significantly lighten a metal chassis with no discernable loss in stiffness. Mark a grid on the bottom of the chassis; then drill a series of $\frac{1}{16}$ - or $\frac{1}{8}$ -inch holes, keeping at least one diameter away from the edges of the pan. Carefully de-burr all the holes; then line the inside of the pan with a self-adhesive shelf paper to keep out the dirt.

Tod Fisk, Matthews, NC

Radio Control Car Action will give a free one-year subscription (or one-year renewal if you already subscribe) for each idea used in "Pit Tips." Send rough sketch to Jim Newman, c/o Radio Control Car Action, 251 Danbury Rd., Wilton, CT 06897. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO AND NOTE YOU SUBMIT. Because of the number of ideas we receive, we cannot acknowledge each one, nor can we return unused material.

TRACK REPORT



W C M

SUPERMODIFIED

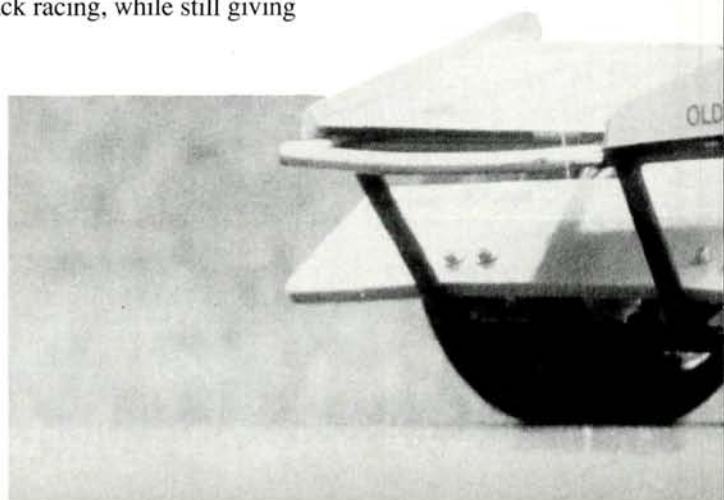
THE POPULARITY OF 1/4-scale racing is growing quickly, and WCM*, a company known for true-to-scale high-performance cars, has contributed to this growth. I knew that I had entered a new realm of R/C modeling when I saw WCM's Supermodified—a serious racing car that comes partially assembled.

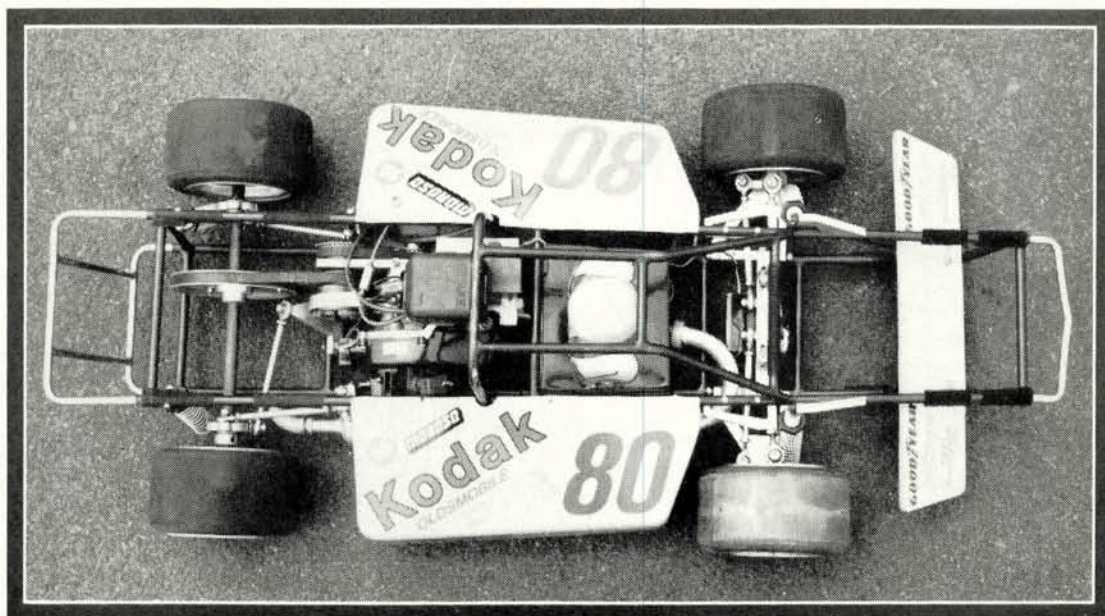
by BILL HENNING

THE KIT: The entire front suspension, motor, and rear suspension are already installed, and the front corners are independently suspended by upper and lower A-arms. The upper A-arms have a large, metal rod end that's connected to the spindle, and this makes camber adjustments easy. These A-arms are supported by adjustable, oil-filled, coil-over shocks. The right front coil spring is heavier than the coil springs on the other three shocks, and this pre-loads the right front tire. This method of pre-loading sets up the car for oval-track racing, while still giving full suspension travel. This car is purely a go-fast-turn-left oval racer.

On the rear of the car, there's a straight axle supported by a ball bearing on each side. The bearing supports, which house the axle bearings, are connected to the frame by four adjustable radius rods. To keep the rear end centered in the frame, there's an adjustable panhard bar connected from the right-hand bearing support to a mount on the frame. A second pair of oil-filled, coil-over shocks, that's identical to the front pair, is used in the rear to absorb the bumps of the racetrack.

The drive system consists of two belts: The pri-





The tubular chassis provides plenty of protection for the internal components. The front wing acts as a bumper.

T O B O O G I E

primary belt connects the engine to the jackshaft, and the secondary belt connects the centrifugal clutch (which rides on the jackshaft) to the fiberglass rear axle. There's a variety of gear ratios, because the pulleys on the engine and the jackshaft are interchangeable.

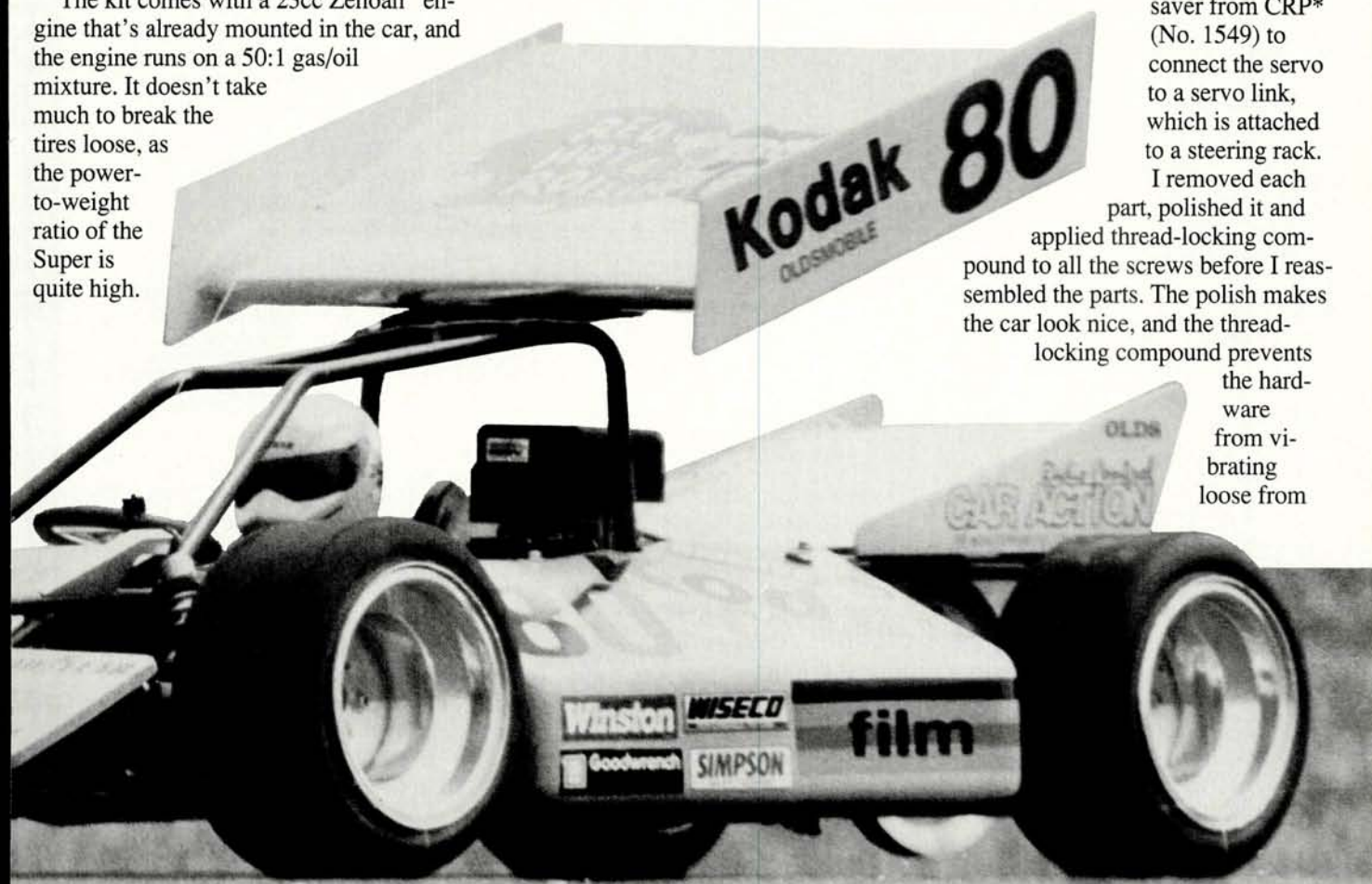
The kit comes with a 23cc Zenoah engine that's already mounted in the car, and the engine runs on a 50:1 gas/oil mixture. It doesn't take much to break the tires loose, as the power-to-weight ratio of the Super is quite high.

This motor has become the standard in 1/4-scale racing.

ASSEMBLY: First, I put 40WT oil in the shocks. (I found 30WT a little too soft), and then I installed the steering servo—a Futaba* S-34 servo will bolt right in. A heavy-duty servo arm is available from WCM*, but I used a large servo-

saver from CRP* (No. 1549) to connect the servo to a servo link, which is attached to a steering rack.

I removed each part, polished it and applied thread-locking compound to all the screws before I reassembled the parts. The polish makes the car look nice, and the thread-locking compound prevents the hardware from vibrating loose from



WCM INC.

SUPERMODIFIED

Type Supermodified
Scale 1/4
Sug. Retail Price \$995

DIMENSIONS:

Overall Length 39.5 inches
Width 17 inches
Height 9 inches
Wheelbase 23.5 inches
Front Track 14.5 inches
Rear Track 14 inches

WEIGHT:

Gross (w/bat.) 21.5 pounds

BODY:

Type Open wheel w/side pods & front shroud/dash
Material ABS plastic

CHASSIS:

Type Tubular w/roll-cage
Material 4130 tubular steel

DRIVE TRAIN:

Primary Belt
Transmission Jack shaft w/belt drive
Differential None
Bearings Ball bearings

SUSPENSION:

Front: Type Double A-arm
Dampening Oil-filled, coil-over shock
Rear: Type Radius arms w/pan-hard bar
Dampening Oil-filled, coil-over shock

WHEELS:

Front and Rear:
Type Two-piece aluminum
Dimensions (DxW) 4x3 inches

TIRES:

Front and Rear Foam core w/rubber shell

ELECTRICS:

Motor 1.4HP, 23CC Zenoah
Starter Recoil starter

OPTIONS AS TESTED:

Top wing; tuned exhaust; Futaba PCM Magnum radio; 5-cell SCE receiver battery pack; steering wheel; driver.

COMMENTS:

The Supermodified was fun to build and easy to drive. It looks realistic on the track, and even when it crashes. Don't run this car without using a thread-locking compound on every nut and bolt, or it may fall apart. This 1/4-scale oval racer is for the serious R/C enthusiast.



The Supermodified has oil-filled, coil-over shocks on every corner. The driver's head adds realism.

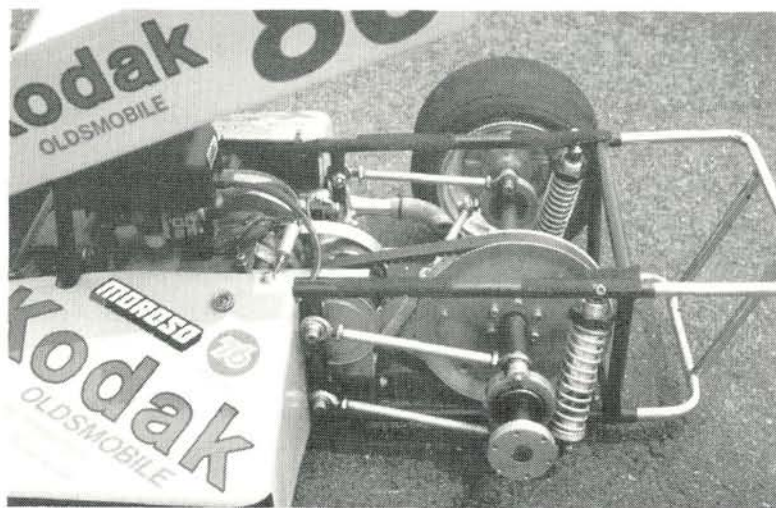
the car.

Cut out and paint the side pods. When you drill the holes for the side pods, be sure to leave approximately $\frac{3}{16}$ inch from the center of the hole to the edge of the side pod; otherwise, the hole will rip out. Also, when running the tuned exhaust, be sure to cut a hole that's big enough for the exhaust, or it will melt the side pod.

and numbers and WCM decal sheets for the minor sponsors' names. I also painted and detailed the optional driver and steering wheel that I had ordered.

Next, I assembled the fuel tank and installed the fuel lines and the fuel filter. I used tie-wraps to strap the fuel tank to the inside of the left side pod.

For a car this size, choose a good radio. I wouldn't want to be around if one



Two radius rods on each side keep the rear end stable. The rear cage keeps out unwanted visitors.

As always, it took me a couple of days to decide on a paint scheme. Meanwhile, I sanded all the parts to be painted (side pods, engine cover, front shroud, top wing, and front dive plane), primed them and then wet-sanded them.

By the time that had been done, I had decided on a simple paint scheme. First, I painted the parts with Plasti-Kote* medium yellow automotive paint. This is available at any auto-parts store, and it must be gasoline-resistant. I used Pro-cut* decals for the main sponsor's logo

of these cars went out of control. To help eliminate any chance of frequency interference, I chose the high-tech Futaba* Magnum PCM radio. To cushion it from shock in the event of an accident, the receiver is mounted inside the left side pod with Velcro.

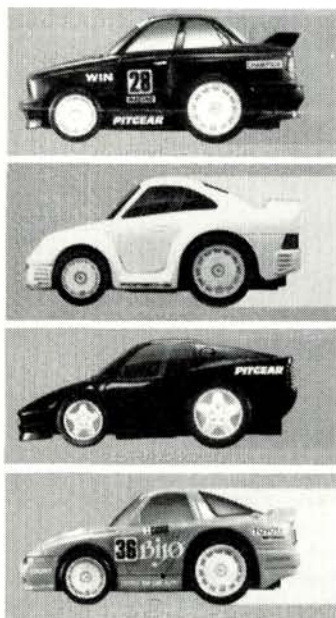
The antenna wire is spliced to the whip antenna that comes in the kit. A 5-cell SCE battery pack that powers the receiver and servos

(Continued on page 120)

INSIDE SCOOP

by RICH HEMSTREET

The R/C CAR industry is rapidly advancing, with new products being offered at a head-spinning rate. So, I'll make manufacturers nervous, but feed you R/C squirrels who are hungry for info, by bringing you a special report on security leaks and "late-in" items. Here goes!



BRIEFCASE RACERS

An entire 10-car heat of these new R/C racers could be carried in a briefcase. Pit Gear makes six 1/52-scale sports cars. These little cars have fully proportional steering and speed controls; and although their run time is only 2 to 3 minutes, they apparently take only 45 seconds to recharge. The radio and car combo costs only 12,800 yen!



STADIUM RACER LEAPS THE PACIFIC

The new Nissan King Cab from Tamiya has made it across the Pacific. This truck features an all-new tub-style chassis and suspension sys-

tem. A front anti-roll bar is standard—probably to counteract the high center of gravity. The transmission appears to be similar to the

one found on the new As-tute. Watch for this one leaping jumps at your local track in the near future.



BAT RIDE

The Bat Wedge is on its way! This new body looks as if it were designed in Gotham, but it really comes from the West Coast. Watch out for the Bat Wedge on dirt ovals nationwide.



RECHARGEABLE TORO

From Europe comes the 8x7-inch battery-powered R/C Minikarten. It certainly looks like a down-sized riding lawnmower, and it must be pretty quick around the flower beds—the driver wears a seatbelt!

REDLINE RE-ALIGNS

Redline Modifieds—builder of some high-powered oval motors—has been bought by an un-named purchaser. Despite rumors of disbanding, the guys are getting ready to go full tilt in 1990.

SORRY, WRONG NUMBER

The phone number of Houge Enterprises is (407) 859-0134 and not as listed in the "1990 Buyer's Guide."

BUILDING IT
RIGHT

STARTING TO TAKE SHAPE

by WALLY DAVID

IF YOU'RE LIKE me, you want to start building a new R/C car as soon as you open the box. Because I usually can't wait, the first two installments of "Building It Right" have been agonizing for me, but the time has finally come to start building the Yokomo* YZ-10!

Last time, I ended by telling you where I started to grind the battery slots and the front and rear edges of the chassis. I'll continue that now by grinding out the remaining battery slots and the chassis edges. I grind the slots to position the batteries as low in the chassis as possible and, consequently, close to the track surface, as this lowers the center of gravity. If the slots aren't smooth, the shrink wrap on the cells can be cut by their sharp edges.

The Dremel* Moto-Tool with the optional flex shaft is perfect for this task. The flex shaft allows you to hang the main unit from your work table, leaving the very lightweight flex shaft in your hands. This makes precision work extremely easy. A sanding drum is good for the flat surfaces, and a long, thin grinding bit works well

for the corners of the slots.

The next step is to install the graphite backbone onto the chassis, but I found a product that eliminates this step and provides greater chassis stiffness, but I'll tell you about that a little further down the line.

To continue: Separate the rubber front and rear bulkheads and motor-mount gaskets from the sheet. Be extremely careful not to rip them! Brush on a thin coat of contact cement and glue the gaskets onto the chassis, being sure to align the holes in the gaskets with those in the chassis.

Install the aluminum bulkhead and motor mount according to the photos. I substituted a tough, nylon, front bulkhead from RPM* for the stock aluminum one, which, reportedly, has a tendency to crack.

Construction continues with the assembly of the center shaft, the torque limiter and the front drive hub unit. Follow the steps in the manual; they're very clearly explained and illustrated. You must now choose between full-time 4WD or part-time automatic 4WD. Full-time 4WD is

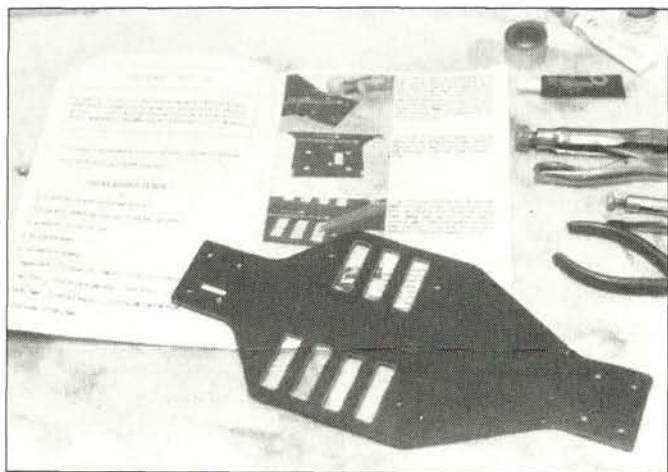


1. A neat, organized work area is important to make things go easily. Notice the TV and VCR remotes in the foreground; they're essential in keeping track of full-size auto races on tape!

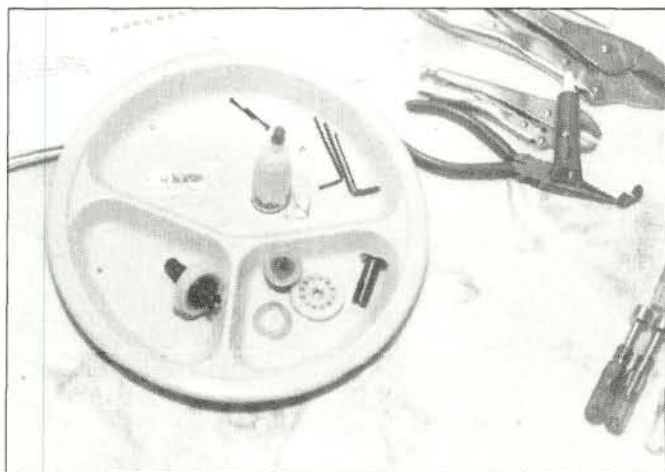
recommended for novices and for driving on slippery tracks. The full-time setup has a direct-drive hub onto which the main gear mounts. For part-time 4WD, a one-way bearing in the hub gives quick steering for faster cornering, but it also makes tire choice critical on anything other than high-traction tracks. Because I don't have much off-road experience, I chose to go with the full-time hub.

Assembly of the two differentials is next. The only tricky part is keeping track of the little diff balls; this is where a towel on the work table comes in handy!

Once the diff assemblies are complete, install them in the bulkheads, along with



2. The battery slots and edges of the chassis are now finished. The photos in the manual are quite clear.



3. On the left side of the plate is a completed diff assembly. On the right is one in the works. I used Bud's Silicone to lube the diff balls.

BUILDING IT RIGHT

the center shaft and the drive belts. Make sure that you lightly oil the ball bearings throughout the car. I use Dan's RC Stuff* Banana Lube, which works well and smells (as its name implies) like bananas. You only need a drop or two on each side of the bearing.

The long belt goes around the front diff and the front drive pulley on the main shaft; then the front diff is installed into the front bulkhead. Make sure the diff is offset to the left. If you use the RPM front bulkhead, you'll have to remove the top piece and one of the side plates to install the front diff. Now, slip the short belt around the sprocket (smaller gear) of the main gear and the rear diff. Set the main gear assembly into the motor mount, and set the rear diff into the rear bulkhead. Make sure the offset of the rear diff is to the right. Install the caps on the rear bulkhead and motor mount, and this step is finished.

At the ROAR Off-Road Nats, I saw the upper chassis stiffener that former World Champion Jay Halsey used on his YZ-10, and I discovered that it was a prototype of the one he was about to release. I got my hands on one of the first production units, which will be the first item released

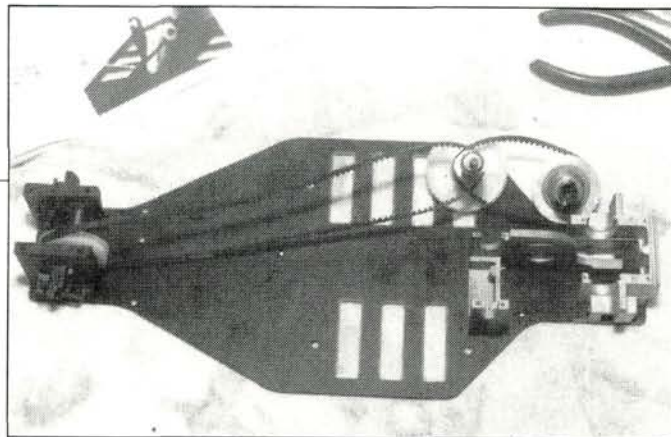
in his line of Jammin' Jay's Products*. I'm happy to say that it fits perfectly! It bolts onto the front bulkhead, the motor mount and the rear bulkhead. This upper chassis stiffener won't let the bulkheads and shock towers flex under stress, and this prevents damage to the bulkheads. The belt tensioner is attached to the underside of the upper chassis stiffener by means of a special aluminum bracket that's supplied by Halsey. Make sure the belt

runs over the tension pulley. Don't worry about belt tension right now; just attach the front and rear shock mounts to the "ears" on the sides of the bulkheads.

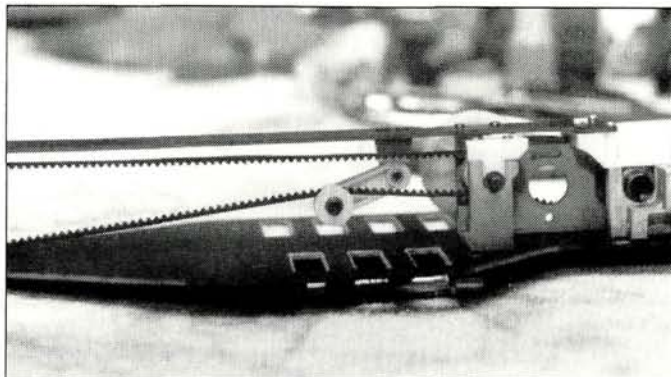
The next few steps really need your complete attention, because things can get

a little confusing! Yokomo has multi-purpose steering block/hub carriers for the left and right side. The one with the "L" on it is used as the left front steering block, and the one with the "R" is for the right.

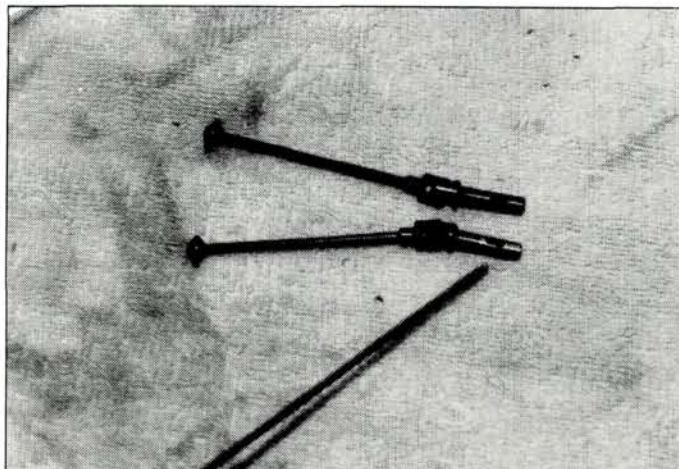
(Continued on page 124)



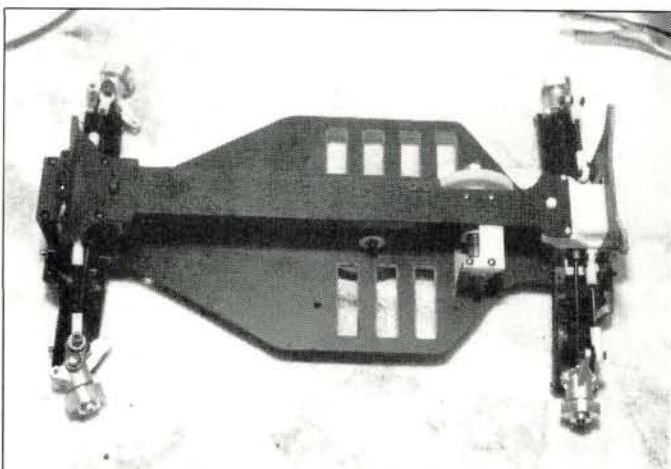
4. This shot shows the bulkheads and the motor mount in place on the chassis. Attach both belts to the main shaft before installing it into the motor mount.



5. The Upper Chassis Stiffener from Jammin' Jay's Products replaces the stock backbone and doesn't allow the chassis to flex; this eliminates the problem of broken bulkheads.



6. The ball driver is pointing to the area on the universal shaft that needed to be ground down to fit the bearing and the hub.



7. The completed YZ-10—so far. Notice that the steering blocks and rear hub carrier are the same thing. By using multi-purpose parts, you won't need to carry as many spares.



TAMIYA'S NEW
2WD CONTENDER

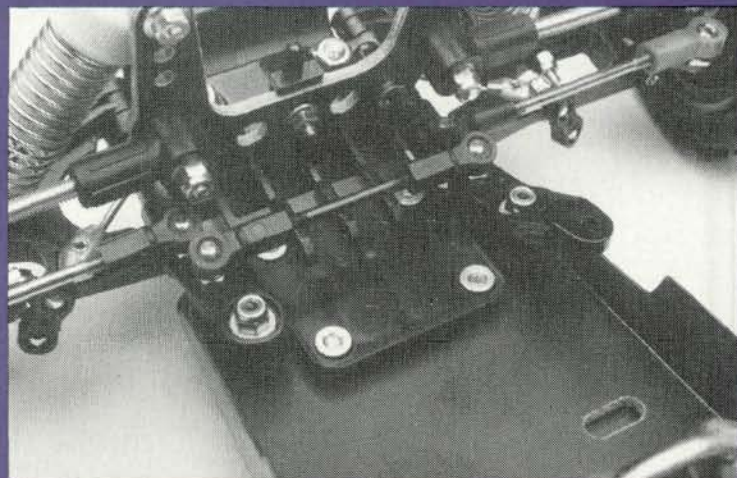
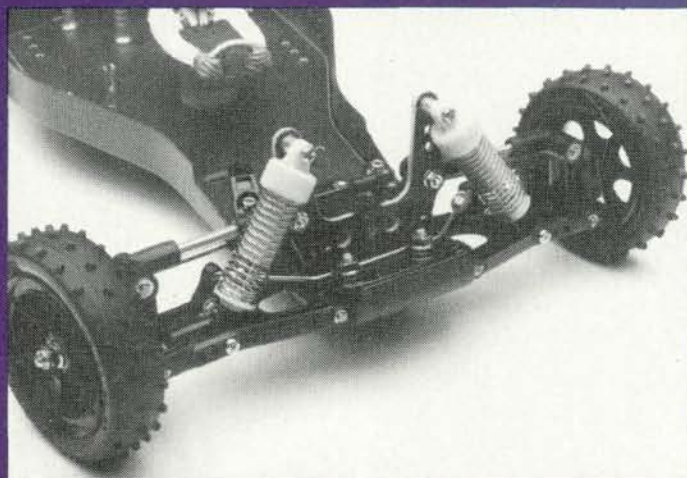
TAMIYA

ASTUTE

by JIM DAHL

IF YOU'RE LOOKING
for something new to

race at the local off-road track this spring, the Tamiya* Astute might be just the ticket. As the leading manufacturers in 1/10-scale 2WD constantly upgrade the design of their offerings, it's terrific to see a



Left: Every hinge point on the Astute has bronze Oilite bushings to prevent premature wear. Right: The Astute uses a bellcrank steering system that's similar to other competitive 2WD cars.

major company enter this arena.

Those of you who enjoy building and racing models will surely love the Astute. This kit has all the features

that have made Tamiya so popular with consumers. The instruction book is very clear and thorough; the plastic parts are beautifully designed; and the large collection of hardware is well thought-out. Top this off with a gorgeous body, a wing, new wheels and new tires, and it all adds up to a lot of fun.

Feast your eyes on some of the Astute's features: FRP chassis and shock towers; lower A-arms, front and rear; adjustable upper links, front and rear; steel shafts with E-clips at every pivot point; ball joints in the bellcrank-steering linkage; front sway bar; dogbone half shafts; splined axle/hex-nut rear-wheel drive; an adjustable ball differential; external spur gear; four fully adjustable oil-filled, coil-over shock absorbers; an aluminum motor plate; and an adjustable rear wing.

There are a few extras that you don't find on many cars: bronze Oilite bushings (36 of them!) for every steel pivot shaft and two-piece rear hub carriers that are adjustable for toe-in.

The Tamiya Astute was fun to build, and it's a great-looking car. Many of its features are equal to—or better than—those of other cars in this very competitive class. I'll first test the car in its stock form, even though some pieces are considered "entry-level." Later, for a Project Astute, I'll upgrade some of these basic pieces to see how the car will do when essentially equal to competition-level cars, e.g., the JR-X2, the RC10 and the Ultima.

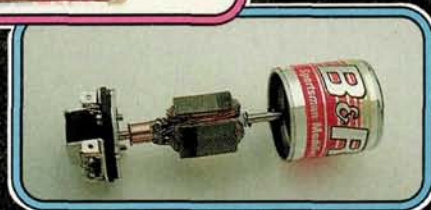
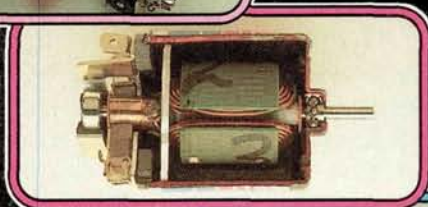
Keep a lookout for the full track report on this exciting new entry in the hot 2WD category.

**Here's the address of the company featured in this preview:*
MRC/Tamiya, P.O. Box 267, Edison, NJ 08818.

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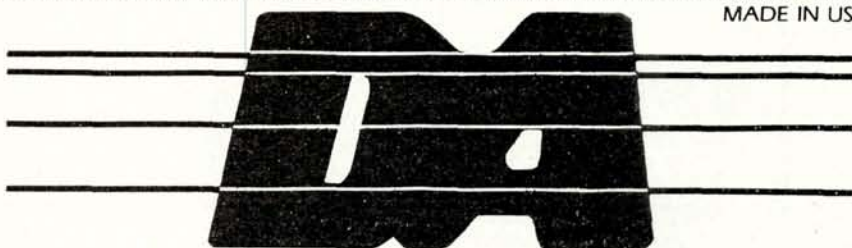
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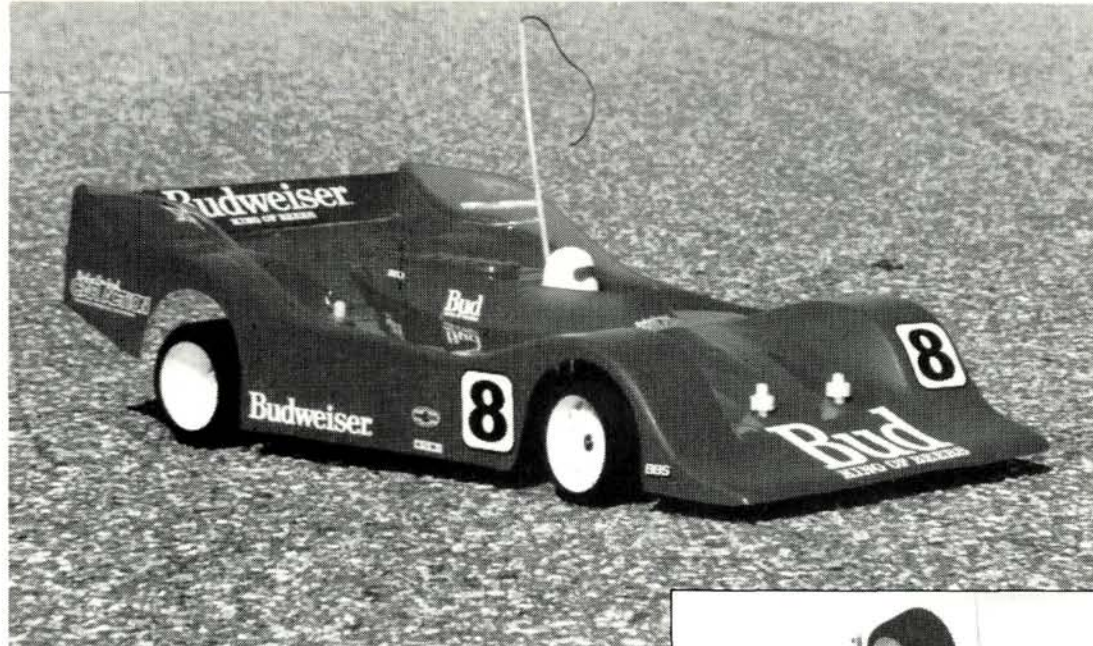
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Left: C&M includes a sharp MRP Spyder body on its CanAm version of the Cobra.

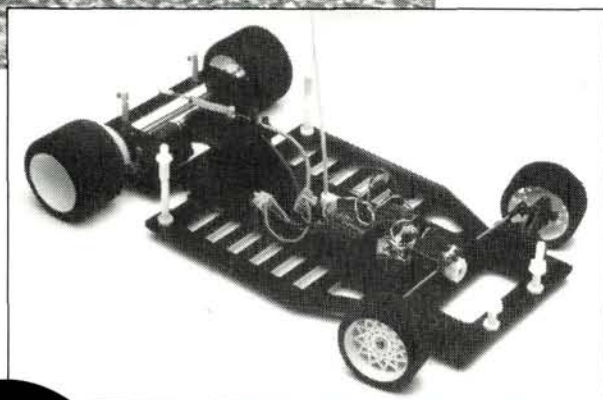
Below: There's lots of room to lay out radio equipment, and you can place batteries all over the place.

by RICH HEMSTREET

EVERYBODY SAYS THAT ELECTRIC on-road racing is getting bigger all the time. Now C&M Manufacturing* has designed a bigger car for electric racing; it's a 1/8-scale version of its 1/10-scale Cobra line. The new Cobra uses the wheels and tires that are common to 1/10-scale on-road cars; the motor and radio equipment is also identical to that found on the smaller Cobras.

While 1/8-scale Cobras still use sub-C batteries, you're no longer limited to six or seven cells. These cars are being driven successfully with up to 10 cells. Because C&M has kept the weight down, these cars are capable of running competitive lap times. Some tracks have 1/8-scale Cobras limited to racing with just 6-cell packs: We need to establish national rules for 1/8-scale electric racing. The 1/8-scale Cobras are available with either Stock Car- or CanAm-style bodies. The Spyder CanAm body on this car is produced by MRP*. These large bodies were initially designed for 1/8-scale gas cars, but they're now being produced in thinner polycarbonate for the lighter electric cars. MRP has several other 1/8-scale bodies available, and Parma* and Associated* also have 1/8-scale bodies that will work on the new Cobra.

Both fiberglass and graphite versions of the new Cobra are available, and when you see how large the chassis is,



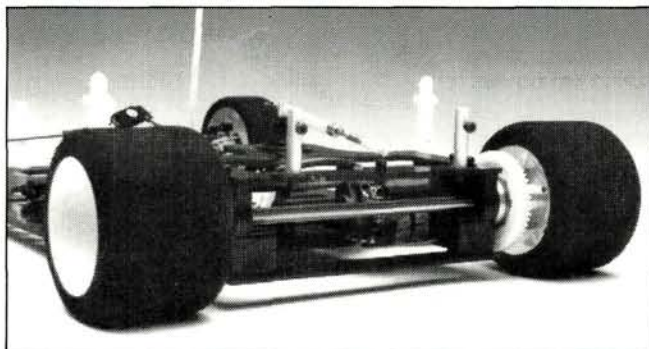
PHOTOS BY STEVE POND

C&M 1/8-SCALE COBRA

Bigger bite than 1/10 scale

you won't be surprised that the graphite chassis offers quite a weight savings over the fiberglass car. In fact, the graphite 1/8-scale car weighs the same as most 1/10-scale on-road cars.

Even though these cars are larger, they're being raced successfully on the same tracks as 1/10-scale on-road cars. Even with an extra cell or two on board, the large Cobras are reportedly easier to drive than 1/10-scale cars. Watch for *Car Action's* full review of C&M's new 1/8-scale Cobra in the near future; at that time, we'll attempt to determine if bigger is better.



The rear pod is wide enough so that you could almost run two motors at once. A graphite axle would eliminate a lot of weight.

*Here are the addresses of the companies mentioned in this article:
C & M Manufacturing, P.O. Box 680-233, Park City, UT 84068.
MRP, 18676 - 142 Ave. NE, Woodinville, WA 98072.
Parma International Inc., 13927 Progress Pkwy., North Royalton, OH 44133.
Associated Electrics, 3585 Cadillac Ave., Costa Mesa, CA 92626. ■

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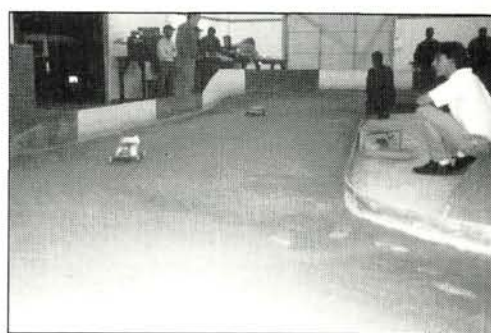
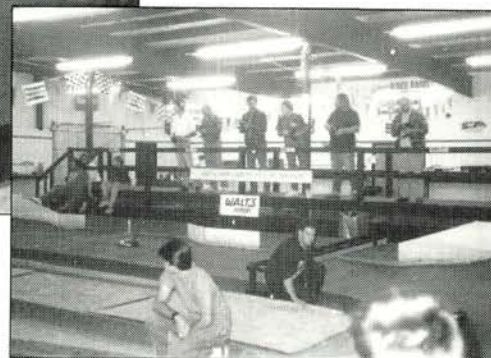
HOT TRACKS

Welcome to "Hot Tracks." Each month, we'll choose an outstanding track to feature in this column. To qualify, send in some high-quality, black-and-white photos of your track, along with a description (approximately 500 words), and tell us why your track should be chosen. Send your entries to Hot Tracks, Radio Control Car Action, 251 Danbury Rd., Wilton, CT 06897.

WALT'S HOBBY, SYRACUSE, NY



Left: The banked carpet track for oval or roadcourse racing. Below: The elevated drivers' stand for both tracks. Bottom: There's also an indoor clay track with a truck-pulling pit.



WALT'S HOBBY in Syracuse, NY, recently celebrated the grand opening of its new racing facility. Housed in a 12,000-square-foot building, it features two banked tracks—one carpet and the other clay—and a fully stocked R/C hobby shop.

The original store (which opened in 1975) had less than 500 square feet, but now, 14 years later, owners Walt and Jan Throne, have seen their dream facility become a reality.

The 72-foot-long carpet track, which is 28 feet wide and has banked turns, can be used for oval or roadcourse racing. The 62x35-foot clay track is shaped like a teardrop and has one wide turn and one high-banked, narrow turn. In the center of the clay track, there's a 35x5-foot, dirt pulling pit. There's a large, elevated, drivers' stand between the tracks, and it can be used for either track. The track area has built-in workbenches that have plenty of AC outlets and can accommodate 150 racers.

Large glass windows and doors separate the retail store from the track, so buyers can watch the action while they

shop. The full-service store is staffed by experienced employees who will put racers back into action quickly.

The future has much in store for racers in the Syracuse area. A 100x50-foot dirt-oval, off-road track is under construction and should be ready in the spring. Plans also include an outdoor pulling pit and a paved drag strip.

For further information, contact Walt's Hobby, 2 Dwight Park Dr., Exit 5, Route 690 West, Syracuse, NY 13209; (315) 453-2291. ■

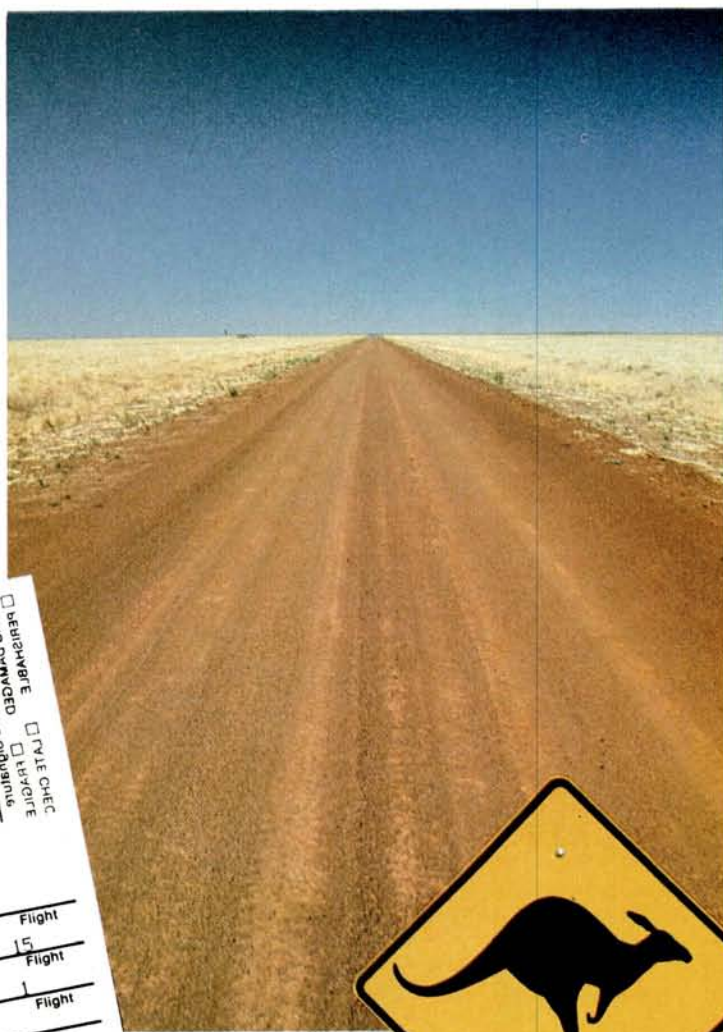
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WORLD CHAMPIONSHIPS

Australian

by RICK HOULE



Dukin' it out down under!



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CONTINENTAL





Cliff Lett, Jay Halsey, and Masami Hirosaka take a champagne shower after sweeping the top three spots in 2WD!



How many dignitaries can you spot in this photo? Finals action awaits them.



This poor racer wasn't successful in staying clean, though.



Trying to get through turn one cleanly was important to a successful run.



Flags of many countries added to the



Steve Dunn takes some hot laps on the Race Prep Pit Vehicle!



No, this isn't Rick Houle, either.



A good, old-fashioned Aussie barby.



Masami's "stealth" 2WD car on the way to the 2WD crown.



- **S**YDNEY, AUSTRALIA, September 5 through 10, 1989. In an event perme-
- ated by controversy, drama and intrigue, after six days of intense competi-
- tion, the 1989 IFMAR World Championship Titles have been contested and the
- world's best drivers have been crowned. The event consisted of two days of
- timed practice and qualifying and one day of main events for both the 2WD and
- 4WD classes. The story of the "Worlds," however, began weeks before the Aus-
- tralian rendezvous and will undoubtedly continue for months to come.



Offroad WORLD CHAMPIONSHIPS

IFMAR WORLD CHAMPIONSHIPS

2WD A-FINAL

Fin.	Driver (Country)	Car	Motor	Speed Control	Body	Tires (f/r)	Special Equipment
1	Masami Hirotsuka (JAP)	Associated	Reedy	KO CX3	Assoc. Protech	Yok. TR31 (f/r)	Prototype car
2	Jay Halsey (USA)	Associated	Reedy	Novak T1X	Assoc. Protech	Race Prep/Yok. TR31	Prototype car
3	Cliff Lett (USA)	Associated	Reedy	Novak T1	Assoc. Protech	CRP/Yok. TR31	Prototype car
4	Mike Dunn (USA)	JR-X2	Race Prep	Novak T1	Losi Pro	Losi (f/r)	Lg chas/slipr clu
5	Rick Vehlow (USA)	Associated	Reedy	Novak T1X	RCPS Mirage	Race Prep/Yok. TR31	Prototype car
6	Jamie Booth (GB)	Top Cat	Reedy	Nosram	Stock	Schumacher/Losi	Slipper clutch
7	Craig Drescher (GB)	RC10 Graphite	Reedy	Novak T1	RCPS Mirage	CRP/Yok. TR31	
8	Jack Johnson (USA)	JR-X2	Revolution	Tekin 600	Losi Pro	Losi (f/r)	Long chassis
9	Joel Johnson (USA)	Ultima Pro	Trinity	Novak T1	Stock	Losi (f/r)	
10	Ron Rossetti (USA)	JR-X2	Revolution	Novak T1	Losi Pro	Losi (f/r)	Lg chas/slipr clu

4WD A-FINAL

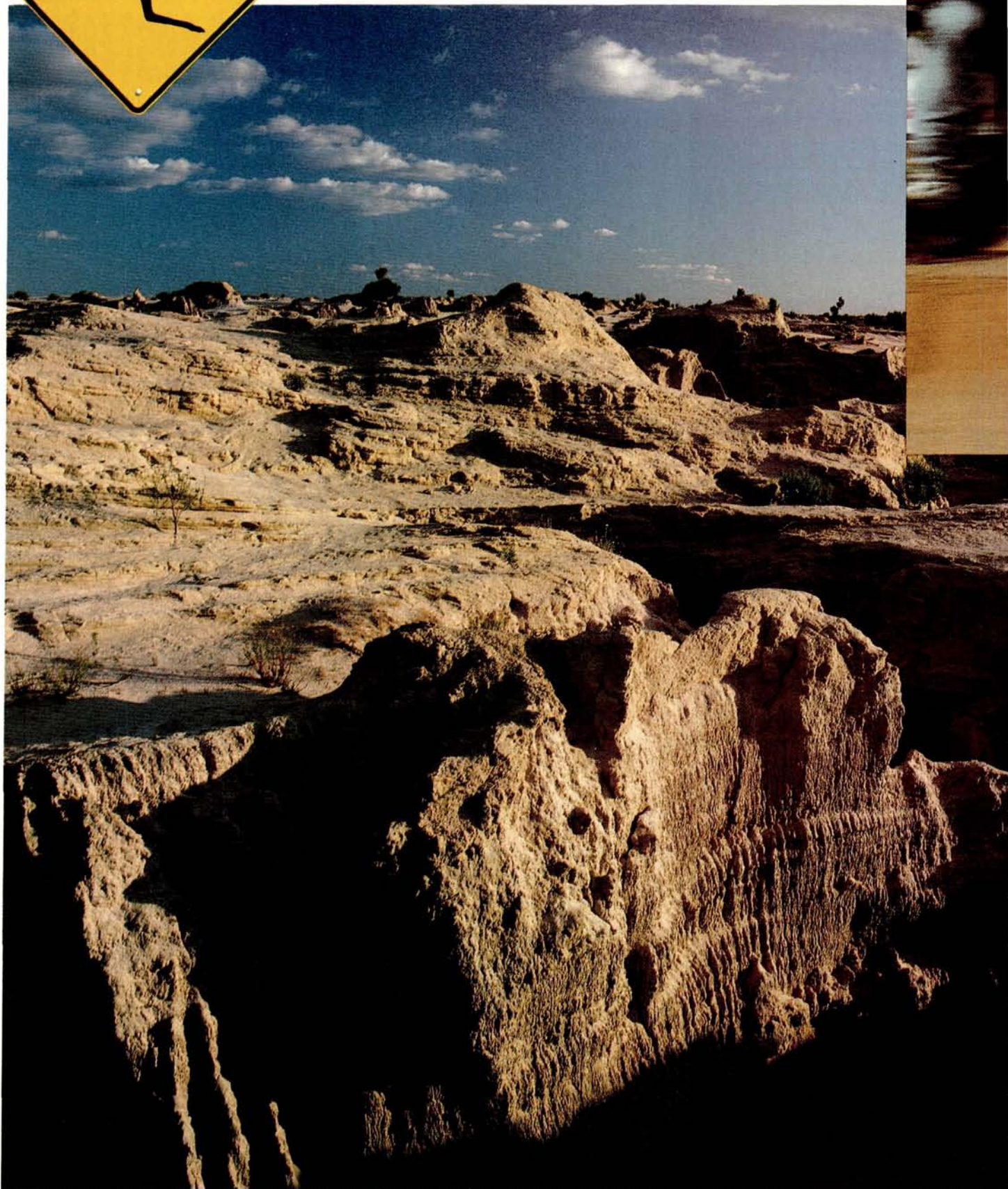
Fin.	Driver (Country)	Car	Motor	Speed Control	Body	Tires (f/r)	Special Equipment
1	Masami Hirotsuka (JAP)	Dogfighter	Reedy	KO CX3	Stock	Yok. TF330/Yok. TR31	
2	Butch Kloeber (USA)	YZ-10	Reedy	Novak T1X	Stock	Yok. TF330/Yok. TR31	Front mono-shock
3	Rich Hohwart (USA)	Lazer ZX	Peak Perf.	Tekin 700	Stock	Schumacher/Losi	
4	Cliff Lett (USA)	YZ-10	Reedy	Novak 1	Stock	Yok. TF330/Yok. TR31	Front mono-shock
5	Jurgen Lautenbach (WG)	Pro Cat	LRP	Nosram	Stock	Schumacher/TAG	
6	Phil Davies (GB)	Pro Cat	Reedy	Corally	Stock	Schumacher (f/r)	
7	Mike Dunn (USA)	Pro Radiant	Race Prep	Novak T1	Race Prep Boost	Yok. TF5/Losi	
8	Satoshi Kayano (JAP)	Dogfighter	Reedy	KO CX3	Stock	Yok. TF330/Yok. TR31	
9	Rory Cull (GB)	Pro Cat	Reedy	Nosram	Stock	Schumacher (f/r)	
10	Jay Halsey (USA)	YZ-10	Reedy	Novak T1	Stock	Yok. TF330/Yok. TR31	Front mono-shock

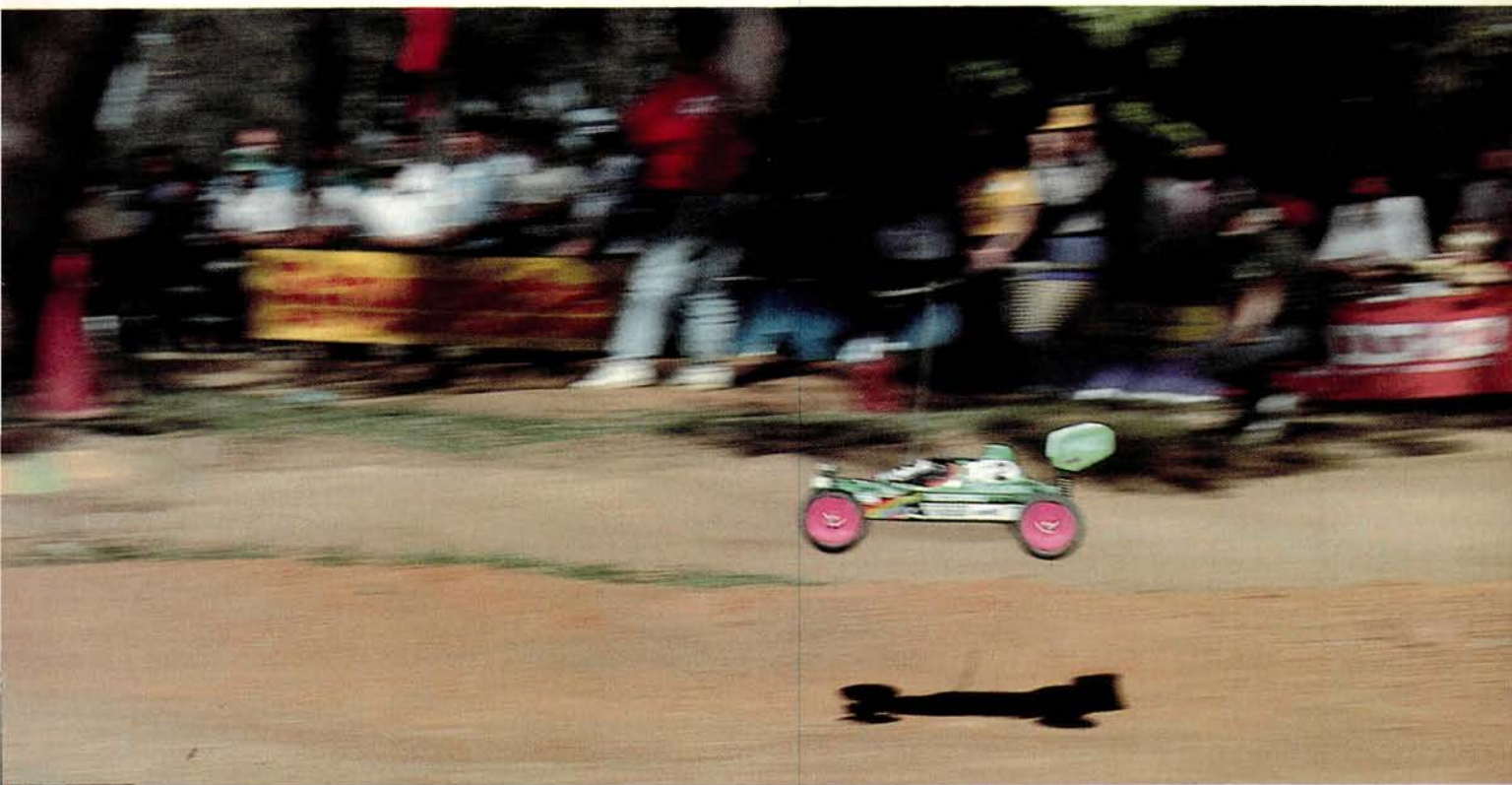




Offroad

WORLD CHAMPIONSHIPS





ALL'S FAIR IN LOVE AND R/C?!

The founding fathers of the IFMAR World Championships created the organization to provide an international arena whereby the world's best drivers could compete with one another in the "Olympic" spirit. The drive to build the "ultimate" machinery, however, coupled with the manufacturers' zeal to generate sales revenue from their products, has turned this event into a battleground for the largest names in the industry. I don't mean that this is solely a manufacturers' event; after all, the world's best drivers must have the world's best equipment. I do mean, however, that the drive to produce winning equipment has created a good deal of tension between the rival manufacturers.



Two-time 4WD World Champion celebrates with his dad Masaaki (left) and Tom Yokobori, owner of Yokomo.



2WD cars sweep through one of the broad turns at St. Ives.

The manufacturers who attended the event spent enormous sums to bring their respective teams to the land of Oz, and all the grumbling among the have-nots about Yokomo's new secret weapon (an oversize tire-and-wheel combo) was quite understandable. During the practice days that preceded the event, these 2 1/4-inch wheels with custom-made, low-profile, mini-spike tires of unknown rubber compounds, were purportedly giving the Yokomo and Associated teams a distinct advantage on this particular track.

The dirt of the St. Ives track is a mixture of sandstone and clay that, when left unwatered,

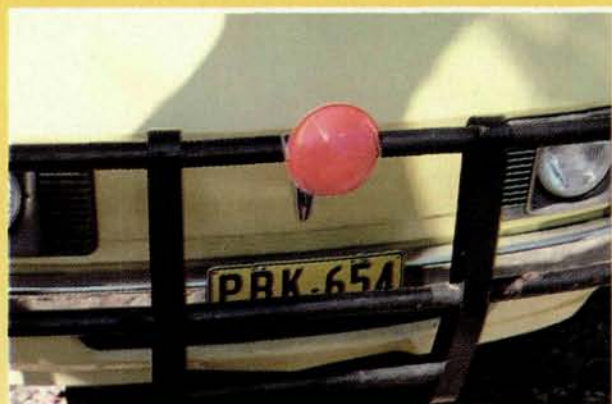
WORLD CHAMPIONSHIPS



Above: Masami's "stealth" Associated 2WD car hustles around a sweeper.

Above right: Standing still, you can see the wide front A-arms and long front shocks on the "stealth" car.

PEDESTRIANS FEAR FOR THEIR LIVES!



WHILE WE WERE in Australia, some of the American drivers obviously got a big kick out of driving their rental cars on the left side of the road—European style. On at least one occasion, hapless Losi team members found themselves on a "Mr. Toad ride," screaming for mercy in the back of a rental van, as they careened down the wrong side of the road with Steve Dunn at the helm! Associated driver Butch Kloeber developed a penchant for racing around the "roundabouts" (traffic circles) frequently found at intersections.

All around Sydney, we spotted red "noses" on autos. September 8 had been declared "Red Nose Day"—a day on which motorists were encouraged to buy the "noses" to raise money for research into crib death. One spectator

even had one on an R/C car!

With the steering wheel and driving controls on the right-hand side of the cars, it was easy to spot American motorists when they flicked what would *usually* be their turn-signal lever and inadvertently switched on the windshield wipers!

It was, no doubt, a hilarious sight for Aussies



when forgetful Americans climbed into the *passenger's* side of their cars, and then had to climb

out and walk, embarrassed, to the driver's side. "Gee, I hope no one saw that!" Fortunately, there were no reports of any major mishaps, and I'm sure all the rentals made it back in one piece!?

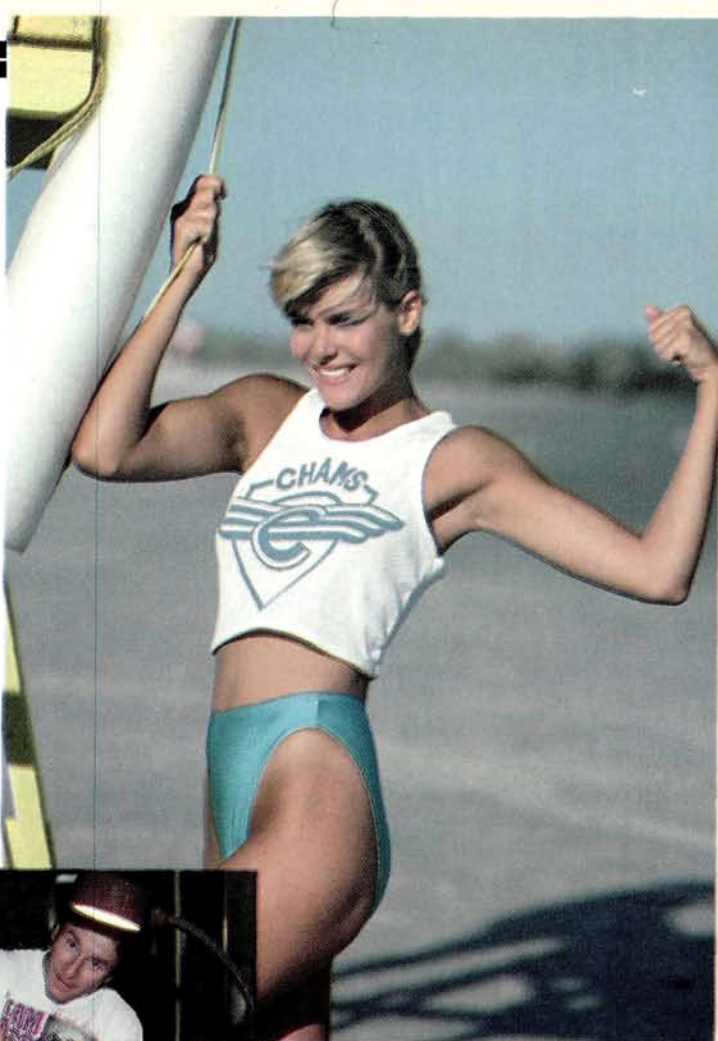


produced hazardous holes on the concrete-like surface. There was also a loose layer of sand outside the racing line, and driving on this was like driving on gravel! As the track's surface deteriorated, the Yokomo wheel played an increasingly large role in the traction department.

Months before the event, a team of Yokomo technicians visited the track to obtain soil samples, which they took back to Japan for analysis. According to local sources, Yokomo also mounted a video camera on a cart that they wheeled around the course to get a "car's-eye" view of the course. Armed with this data, Yokomo exactly duplicated the St. Ives track back in Japan, and this is what the team practiced on. It's small wonder that Masami gave the impression that he could drive this course with his eyes shut!

CLANDESTINE CAR CAPERS!

Another big debate centered on the clandestine activities of the Associated team, who had a new prototype 2WD "stealth" car. The team wouldn't allow the car to be photographed (apparently, under strict orders from the company's owners), unless the racing body hid the important chassis components. Whenever a camera-carrying member of the press walked through the Associated pits, the drivers doggedly threw a towel over the exposed chassis. When a member of the Australian team snapped a few shots of the car at the tech-inspection tent, Associated driver Jay Halsey demanded that the photographer turn over the film to him on the spot! This behavior struck the local Aussies as slightly odd, if not rude. According to Gene Husting, one of Associated's owners, there was good reason for this paranoia about the car's internal makeup: "We want to be able to research and develop certain components of this car without the danger of being ripped-off before we have the first opportunity to market the parts that work satisfactorily." Husting assured me that *Radio Control Car Action* would get the exclusive first photos of the car's chassis very soon, and I was allowed to photograph Masami's



Left: Cliff Lett peers out from behind a pile of the coveted Yokomo TR-31 tires with oversize rims.



Left: Associated's Jay Halsey exchanges pleasantries with Gil "Pops" Losi Sr.



Offroad WORLD CHAMPIONSHIPS

RC10 hybrid close up, albeit with the body on.

NEW FOR YOU

Nearly every major manufacturer of the 1/10-scale off-road cars that competed at St. Ives brought something new or improved, and with the exception of the Associated 2WD hybrid car, these machines were commercially available at the time of the event—or will be, by the time you read this.



The 4WD car from Nikko was in competition at the Worlds. This entry-level car had fair results.

Representatives of Schumacher Model Racing Products (the event's major sponsor) were there in force, handing out kits of the new Top Cat to any driver who would agree to drive it at the Worlds. Seeking to retain the 4WD title without Hirosaka (who now drives for Yokomo), Schumacher introduced a revised version of the Cat—the Pro Cat, which has a new trans-

mission, chassis and rear-suspension geometry.

Kyosho also tried to hold on to its 2WD title with the Ultima Pro, which is an upgraded version of the '87 2WD car (the Ultima Pro has a longer wheelbase and a graphite chassis). With its recently released Lazer Z-X, Kyosho also went after the 4WD title. Team Losi managed to put three of its JR-X2 cars onto the 2WD A-Main grid.

Only one Yokomo made it to the 4WD A-Main in '87, but Yokomo did better this year by putting five Super Dogfighters into the A-Final. Yokomo's American partners, Team Associated, call their Yokomo 4WD the YZ-10. The most noticeable difference between the two cars is in their shocks: The Americans used a mono-shock system (developed by Jay Halsey), and the Japanese car has an upright shock arrangement.

The 4WD A-Main grid was, for the most part, made up of exotic machines driven by Kevlar or polyurethane belts. A notable exception was Team Race Prep's AYK chain-driven Pro Radiant with Mike Dunn at the controls. Widely recognized in the States by production-class racers, Tamiya took

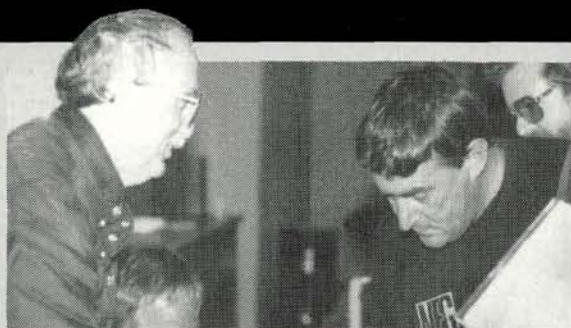
CONTROVERSY! CONTROVERSY!

MOST OF THE COMPETITORS I talked to at the Worlds felt that there was something improper about Yokomo's use of the over-scale tires (designated "TR-31" by Yokomo).

Those who weren't close to the Associated and Yokomo factory drivers' inner circles were simply denied access to these tires. Team Twister driver Joe Schmitz (who was only *half* joking!) said: "Unless something is done about the rules, we may have to change this class of racing to 1/8 scale. These 2 1/4-inch rims would scale up to a 22-inch rim on a full-size car, and when was the last time you saw a wheel *that* size on a full-scale off-road race car? Not only are tires getting taller, but chassis are also getting longer and wider." (IFMAR rules only require that a car be within 18 inches long, 9.84 inches wide, and 8 inches high. Some think these specs are too general and should be more defined.) As Schmitz says, "These cars are just plain bigger!"

Though his teammates didn't seem to be as concerned about the larger wheels, Kyosho driver and 1987 2WD World Champion, Joel Johnson, would have liked a set of the TR-31s to "make this race fair for everyone." Johnson added that "any track with decent bite wouldn't need the taller wheel."

Associated's Gene Husting was quick to point out that, at the 1987 Worlds, Kyosho played the same game with a tire design that gave its team an edge over other com-



Mike Reedy, left, felt that the spirit of the rules wasn't compromised.

petitors, and Kyosho was also very picky about who was allowed to use them. Other sources report that the Kyosho tires were, indeed, available to anyone who needed them.

The prevailing mood among the majority who had to do without the TR-31s was that the evil Yokomo empire had secretly developed these tires with the intention of introducing them at this event to enjoy a distinctly unfair advantage. When I talked to the Associated and Yokomo teams, however, I was given an entirely different impression. According to Husting, "We weren't even aware of this tire's existence until we came to Australia."

Yokomo's Assistant Team Manager, Bunzo Iizuka, told me that the success of these tires at the St. Ives track was just as surprising to him as to anyone else! According to him, the tire was taken to Australia as a possible *rain* tire! Yokomo planners must have expected a lot of foul weather for the beginning of spring in Australia, because they ap-

SPY SHOT!

Hi Rich.

With all the problems I had getting here, things are going very well now.

The race is very exciting. Lots of controversy. Associated and Yokomo are taking full advantage of a loophole in the IFMAR rules and are using wheels that are 2 3/4" in diameter giving them an advantage on the rough track. Associated won't let me photograph their 2WD car. Bye for now

Sydney and the most beautiful harbour in the world. B 11

AIR MAIL
PAR AVION



Rich Hemstreet
RCCA
251 Dard
Wilton

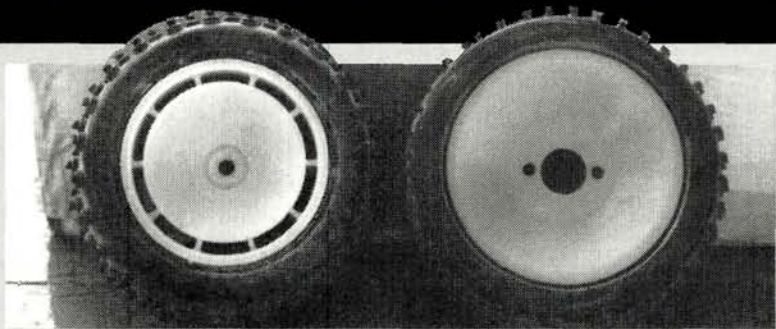


SPY SHOT!

Even though Associated wouldn't permit photos, Rick "007" Houle was able to get some undercover shots of Associated's Roger Curtis with the "stealth" car.

TECH TRICKS?

Faced with the secret weapons of Associated and Yokomo, manufacturers tried every trick to counter the threat of these two dominant teams. The closest any team came to matching the performance of Yokomo's tires was Team Losi. Extremely disturbed by the discovery of this oversize, out-of-scale wheel, Team Losi called on its States-side resources to create, in record-breaking time, a wheel-and-tire combo that would counter this unexpected threat! Within 48 hours, Losi craftsmen had produced about 100 pairs of oversize front tires, 200 pairs of rears and five sets of hand-machined aluminum rims.



At left is a conventional size tire and wheel, next to the infamous, oversize Yokomo TR-31.

parently brought about 30 boxes of these treasures from Japan.

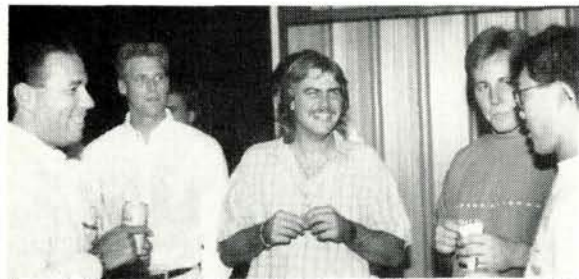
Though the IFMAR rules governing 1/10-scale tires and chassis have remained relatively unchanged since the first World Championship in 1985, they have never come under as much fire as they did at this event. According to IFMAR's President, Ted Longshaw, the organization intended to limit the specifications as much as possible to avoid "overburdening" the rule book with specs. While this philosophy may have been adequate four years ago, rapid technological advances in manufacturing may necessitate a return to the drawing board for the development of a more defined set of rules. After all, if you took the existing rules to the limit, you could theoretically enter a multi-wheel vehicle (the rules don't specify how many) that's 18 inches long and has 8-inch tires, as long as this contraption was only 9.84 inches wide. This fictitious vehicle could have four motors (yes, the book reads "motors"—with an "s") as long as they're approved motors.

IFMAR guidelines allow rules and/or procedures to be altered during a race if they're contrary to the "interest of the sport." Most of the racers I talked to felt that Yokomo's and Associated's use of these over-scale tires was unfair. In every case where protests were made to the Interna-

tional Jury and ORRCA, the host organization seemed reluctant to act without the guidance of the IFMAR VP, Mike Reedy, even though he wasn't technically allowed to vote on these issues. Reedy maintained a high profile throughout the fracas; this was his duty, in the absence of the organization's president. Reedy, who owns Reedy Motors (the ones used by Team Associated and Yokomo), thought that the spirit of the rules wasn't compromised. On the issue of track maintenance (refer to last month's story), again, Reedy was unwavering, and pointed out that everyone was informed, well in advance, that the track wouldn't be groomed between heats; it would be just as it was at Romsey at the 1987 Worlds, and just the way the Aussies like to run their races. Objections had been raised at the '87 event, however, and many racers had assumed that things would be different in 1989. Look for a change in these rules before the next Off-Road Champs in 1991.

WORLD CHAMPIONSHIPS

Though the oversize rubber tires and rims they tried didn't work out as well as they would have liked, team member Ron Rossetti took a standard-size Losi X-pattern tire and



From left: Team Trinity's Ernie Provetti and Joel Johnson enjoy the awards-banquet refreshments with Team Associated's Jay Halsey and Butch Kloeber and Yokomo's Satoshi Kayano.

trimmed the in-side bead to fit over the oversize aluminum rim. The experiment looked promising during practice, but the hand-made rim tended to bend

out of shape and was scrapped in favor of Losi's standard wheels and tires.

Early in the game, Losi was also moderately successful with an experimental two-speed transmission, but they opted for their more conventional tranny in the Finals. This two-speed tranny was actually a better-kept secret than Associated's "stealth" car. Losi informants claim they were given misleading information about the track's dimensions, and they brought this tranny because they'd been led to believe that the course was considerably longer.

Many drivers used slipper-type clutches to counter the effects of the "loose stuff" outside the driving line. In particular, Schumacher seemed to be more successful with its new Top Cat that was modified with a slipper designed by Team Pit Stop's Steven Miniea. (He also supplied slippers and chain-drive trannies to a number of A- and B-Main finalists.)

Some experiments were quite daring: Gary Miyakawa (a Kyosho mechanic) mounted two front tires on a rear Kyosho rim to form a set of "dualies" for driver Mike Burnette. This setup produced great traction on the loose surface, but turning was less than satisfactory.

THE BEAUTIFUL LAND OF OZ

Beyond the controversial overtones (see sidebar), this event was a grand affair, embellished by international pomp and circumstance. The beautiful country surrounding the St. Ives track is an outdoor racer's Valhalla. Set in idyllic bushland, the track is about 35 kilometers from downtown Sydney. The track is permanent and was extensively upgraded for this event with an 8-foot-high steel-and-concrete drivers' stand. The Aussies went all out on this event and were very gracious hosts. The program was very well organized, and the dual AMB scoring system was extremely efficient. Instead of the customary buzzer, each race ended with a polite announcement: "Thank you, drivers."

The prime mover among the Australian organizers was the venerable Jack Grenenger. He was the chairman of the 1989 World Title Committee, and he worked tirelessly before, during and after the event to make this the pinnacle of R/C racing in Australia. No praise is too great for the grand effort of the ORRCA staff and the local racing clubs that helped out. Even the weather cooperated—sunny days and cool nights with just a dash of rain during the evening before 2WD qualifying.

The picturesque track winds through tall trees; there's one major jump at the entrance to the 130-foot straightaway; and there's a mild double jump on one of the infield turns. The soil is clay and dolerite (a dark, porous, sandy, igneous rock). The grassy infields were dyed a deep green, and they contrasted smartly with the golden-colored lanes, which were bordered by 18-inch berms.

Though many of us were a long,



A local TV crew records the action. With the help of Race Prep's Mike Dunn, a mini-cam was able to capture a "car's-eye" view (inset).

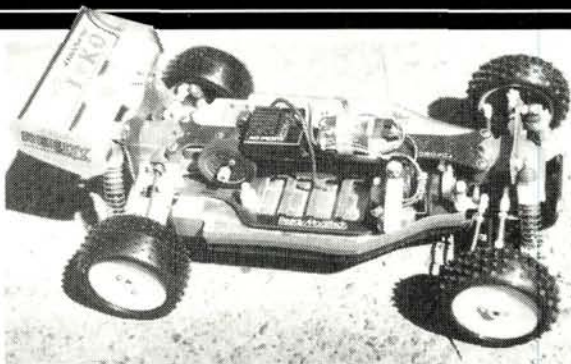


long way from home, the accommodating Aussies have a way of making you feel really welcome—more like a guest than a foreigner—though they do speak a strange

form of English! Many words have entirely different meanings in Oz dialect, and, when conversing with locals, I really had to be careful to avoid misunderstandings. My favorite expression is what Aussies call someone who hammers them on the racetrack: “Ya bloody barger!”

AUSSIELAND ACTION

The official racing action began on Tuesday, September 5, with timed practice for 2WD drivers. The 120 drivers were divided into 12 heats, and the next day (Wednesday) was the most important for qualifying, as five of the six rounds



Masami's Yokomo Super Dogfighter sports upright front shocks, while most of the Americans' Yokomo YZ-10s used a mono-shock setup.



Mike Dunn's JR-X2 was the top production car in 2WD, with a 4th-place finish in the A-Finals.

were run. American-made cars were dominant in 2WD: Nearly all the A- and B-Final grids were made up of the Associated 2WD hybrid, RC10 Graphites and Losi JR-X2s. Of the 30 drivers who made up the A-, B- and C-Finals, 23 were from the U.S.

Masami Hirosaka was the only Japanese driver in the top three Mains, but he made up for the rest of his countrymen by qualifying 4 seconds faster than second qualifier Mike Dunn (who drove a JR-X2) for the pole position (Hirosaka, 16/512.5; Dunn, 16/516.4); and that was only a *taste* of things to come!

Defending World Champion, Joel Johnson, barely made the A-Final with his Kyosho Ultima Pro, and he didn't pose a serious threat to the rest of the field. In 1987, Johnson's Ultima stole the crown from the RC10, but it was a very different story in '89.

Great Britain's Jamie Booth put his Schumacher Top Cat on the 7th starting position in the A-Final grid. Associated's Jay Halsey, Cliff Lett and Rick Vehlow qualified 3rd, 4th and 5th with the stealth car, followed by Craig Dreschler (GB) in the 6th spot with a conventional RC10 Graphite. Qualifying in the 9th and 10th positions were Team Losi's Jack Johnson and Ron Rossetti (both with JR-X2s).

Team Losi driver Jack Johnson summed up what it was like to drive on this track: “The base goes away quickly, and the surface gets more and more slippery,” he explained. “In other words, loose dirt forms on top of the hard surface, and it's like trying to drive on marbles. There's only one decent line to drive through-out the entire course, and if you get outside of it, you're history.”

In 4WD, the Yokomo tires didn't give as much of an advantage as they had in 2WD, and there was a wider range of cars and some different faces on the drivers' stand in the top finals. In a surprising reversal of the 1987 results, Yokomo placed five cars on the A-Final grid (at Romsey, only one qualified), and Kyosho managed to place only one car in the A-Main at

T I M E O U T !

DURING THE TWO WEEKS that the 120 international drivers spent practicing, qualifying and competing in the Finals at St. Ives, racers and mechanics concentrated so intensely on their craft that it was as if they all had blinders on. The competitors came from 20 nations (many leaving their countries for the first time), but most saw no more of Australia than the view from their hotel rooms and the St. Ives Racetrack. This was partly owing to the tight racing schedule and the fact that, with such stiff competition at a world event, these guys (and girl!) couldn't think of anything else.

I had a tough time trying to convince some of the drivers to do a little sightseeing: “What! Are you crazy? This is a world event man!”

Fortunately, on Sunday, when the excitement was over, I managed to talk a handful of racers into an excursion to Darling Harbour in Sydney. Our small group included Cliff Lett, Don Jones, Rick Hohwart, Christian Keil and Chris McElroy.

The tour started at the Harbourside Shopping Mall, and from there we moved on to the underwater Sea Aquarium and Maritime Museum.

After a walk through the town, we took a hydrofoil ride from Circular Quay around the harbor and past the world-famous Sydney Opera House. From there, we went to the historic site of the first European settlement in Australia—the Rocks. After a much-needed breather and some refreshments at the Pumphouse, we went to the top of Sydney Tower, which is the tallest public building in the eastern hemisphere. A round-trip ride on the city's monorail brought us back to our starting point and was a great end to a wonderful day in one of the most famous and beautiful cities in the world.



We think many of our readers have ideas that are worth sharing. How many times have you read an article and said, "I could do that!" or "That's not the only way to do that; my way is easier!" Could be!

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WORLD CHAMPIONSHIPS=

St. Ives (they had five at Romsey).

Again, Hirosaka was unbeatable: He put his Super Dogfighter on the pole with a time of 17/512.22—a scant 0.9 second ahead of Associated's Cliff Lett, who drove a mono-shock YZ-10. Just behind Lett came fellow Americans Rick Hohwart, Butch Kloeber and Jay Halsey. Hohwart had the only Kyosho car (the Lazer Z-X), while Kloeber and Halsey piloted YZ-10s. The 6th- through 8th-place starting positions were held by Schumacher Pro Cats (revised versions of Schumacher's 1987 champion car) in the hands of Jurgen Lautenbach (West Germany), and Phil Davies and Rory Cull (GB). Satoshi Kayano (Japan) qualified with his Yokomo Super Dogfighter in the 9th spot, while Race Prep's Mike Dunn started from the 10th position driving his AYK Pro Radiant.

MAD 2WD MOTORING!

Thursday, September 7 and Sunday, September 10—the most hectic days! The sixth (final) rounds of qualifying, final practice (with transponders) and all three legs of the finals for both 2WD and 4WD were crammed into these two days. Only the A-Finalists raced three heats, and the results of the best two runs determined the overall results. Following recent IFMAR rulings, the racing format called for 6-cell batteries and 5-minute heats.

At the start of round one, Hirosaka blasted off the pole for the holeshot with Halsey and Dunn in tow. Halsey went a little wide in a turn and Hirosaka pulled away.

Hirosaka took the holeshot ... pitching his car into the turns at will!

Meanwhile, Lett was drafting Dunn, waiting for him to make a mistake, but it was Lett who rolled and dropped back, so allowing Dreschler and Booth to get by.

With Hirosaka driving as though his car were on rails, Halsey couldn't get any closer to him than 30 feet, and Dunn held on to the 3rd position, as the three leaders slowly pulled away from the rest of the pack. In these positions, they "freight-trained" to the wire, with Hirosaka taking the win, Halsey in 2nd and Dunn in 3rd—all three with 17 laps (a lap up on the field).

The relatively reserved performances of the first round weren't repeated in round two, when the drivers were obviously more aggressive. At the start, Dunn made an awesome inside move on Hirosaka, and he made it to turn one in the lead! Hirosaka repeatedly charged up to Dunn's car and lightly tapped it on the rear as if he were biting off bits of the wing! Hirosaka made a clean inside pass on Dunn as Halsey came up on the leaders to join the fray. Halsey flew past Dunn over the low doubles only to get out of shape shortly afterward, causing the two cars to collide and Halsey to lose valuable ground. Meanwhile, Lett and Vehlow appeared out of nowhere and began to put pressure on the leaders.

Dunn held off Lett's charge until he rolled, and Lett went past to assume the runner-up position. Vehlow made a bid to get past Lett in the final seconds of the race, but Lett shut the door on him! At the wire, it was Hirosaka in 1st and Lett in 2nd—both with 17 laps—followed by Vehlow and Dunn.

The excitement that had started in the first two rounds increased going into the third, and final, leg of the race. Hirosaka took the holeshot and delighted spectators by pitching his car into the turns at will! Dunn couldn't hang on to the runner-up position for long, as first Halsey and then Lett snuck past.

As Dunn slid out on the "marbles," Booth stole past him for the 3rd spot! Dunn charged back up to the leaders and nudged Booth out of his line to reclaim his former position. Meanwhile, Hirosaka continued to kick out the rear end of his car around the turns as Halsey began to put pressure on the young hotshot. Recovering from a bad start, Johnson moved up into the 4th position when Booth rolled, but then he rolled, too, and this allowed Booth to regain his position. With only seconds left in the race, Halsey, turning up the pressure on Hirosaka, forced the young Japanese to make a rare mistake, and he literally flew over Hirosaka as he rolled! Halsey took this win with Hirosaka in 2nd and Lett in 3rd.

To the delight of the scores of spectators surrounding the track, the ever-colorful Eustace Moore provided the race-action commentary. (I swear the man has a different hat for every day of the week!) Moore was also interviewed by a local TV station that was reporting on the event, and when asked how seriously the competitors took this sport, he replied, "If one of these guys thought he could win by slitting his opponent's throat, he would!" When the final scores had been tallied, Hirosaka was declared the new 2WD World Champion with Halsey 2nd and Lett 3rd. The three victors had floral wreaths placed around their necks, and each was handed a toy

"If one of these guys thought he could win by slitting his opponent's throat, he would!"

koala and a large bottle of champagne—of course, they showered one another!

Between the 2WD and 4WD events, some of the half-time jitters were relieved when D&R Productions—a local video crew that was filming the event—mounted an extremely small camera on the top of Mike Dunn's car to capture a "car's-eye" view of the racing action as three other cars raced around the track. The quality of the playback was excellent and very enlightening; in fact, some of the footage was shown during the evening news report with Formula 1 sound effects dubbed in! (Very creative, these Aussies!)

No sooner had the last 2WD Final race been run, than drivers started to pack up their 2WDs and to crank on their 4WD cars to prepare for the next three days. Considering all the beautiful sights to be seen in Australia, it was a shame there wasn't a break between the two classes to allow the drivers (some of whom were abroad for the first time) to do a little sightseeing.

4WD FINAL FRONTIERS

During the final 4WD practice run (to make sure the transponders were operating correctly), Hirosaka didn't seem to be as dominant, and he only managed to place 4th. Butch Kloeber won the practice ahead of Halsey and Howart, but Hirosaka had other plans for the Americans going into the Finals.

At the start of round one, Hirosaka took the holeshot into the lead, put the pedal to the metal, and was gone! A note of interest here is that Hirosaka's chosen control was a KO CX-3, stick-type transmitter! Meanwhile, Lautenbach was in the runner-up spot with Halsey, Kloeber and Lett in hot pursuit—like hungry dogs! When Lett passed Lautenbach, the West German driver found himself in the untenable position of being in the middle of three of the most aggressive U.S. drivers. Halsey's car broke on his 13th lap, and this left Lautenbach to the mercy of Kloeber, who gave us a brilliant driving display as he fought his way into the runner-up position. For a few laps, he really put pressure on Hirosaka, and then Lett stole back the runner-up position from him in the final seconds of the race! Hirosaka held on for a wire-to-wire win.

In an encore performance in the second A-Final race, Hirosaka again blasted into the lead, while Kloeber had him locked in his sights! Bad luck struck Halsey again, as something in his car went south after only five laps, and he had to pull out of the race.

A determined Lautenbach desperately fought to protect his 3rd-place position from Lett's charges. Lett did manage to get past Lautenbach briefly before he had to give the position back to the Pro-Cat driver. Meanwhile, Hirosaka switched on the afterburners and blasted across the finish line, a full lap ahead of the field, and he upped the pace to 18 laps in the process!

In the third—and final—race, as expected, Hirosaka shot into the lead with Lett and Kloeber in hot pursuit! Kloeber moved past Lett and seemed to hook onto the rear of Hirosaka's car. Lett began to lose ground as Hohwart moved into 3rd. Having better luck in this race, Halsey was posting some of the fastest lap times as he

(Continued on page 56)

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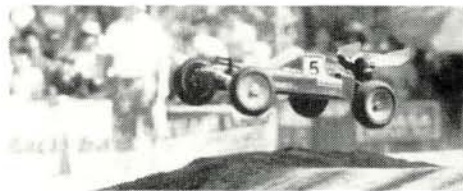


WORLD CHAMPS =

fought his way up into the 4th position.

Dunn's car broke a rear wheel when coming off the main jump on his 9th lap, and it was out of the running. On the dry track, the cars kicked up clouds of dust, and we could barely see from one end of the course to the other.

With less than a minute to the finish and Kloeber climbing all over him, Hirosaka rolled just past turn one, and Kloeber went past him in a flash! In an exciting dash to the wire, Hirosaka charged up to the new leader and tried every move he could think of to pass the American, but Kloeber held on as they both charged across the finish line, racing door-handle to door-handle. (Yes, I know off-roaders don't have door handles!) Kloeber finished just 0.22 second ahead of Hirosaka, and both drivers posted 18 laps.



At the awards ceremony immediately after the scores had been tallied, Hirosaka was declared the 4WD Champion for the second consecutive time, while Lett was 2nd and Hohwart was 3rd. They were given the same spoils as the 2WD winners, and they took the customary champagne bath, then posed—soaked!—for the photographers.

That evening, our gracious Aussie hosts held a barbecue awards banquet where dignitaries gave closing speeches and all the drivers were given plaques. The top three drivers in both classes were awarded large, silver-and gold-plated trophies.

The international competitors, anticipating long return trips to their respective countries, made their farewells to old and new friends and expressed the hope that they'd all meet again in 1991.

Given the mountains of information I had to sort through, covering this event was no small task, and I thank my new friend, Jimmy Joe, who's a photojournalist for the Bay Of Plenty Times Newspaper in New Zealand, for his help with this report. I'm sure you can tell I had a great time!

N O R R C A Dirt-Oval NATIONALS



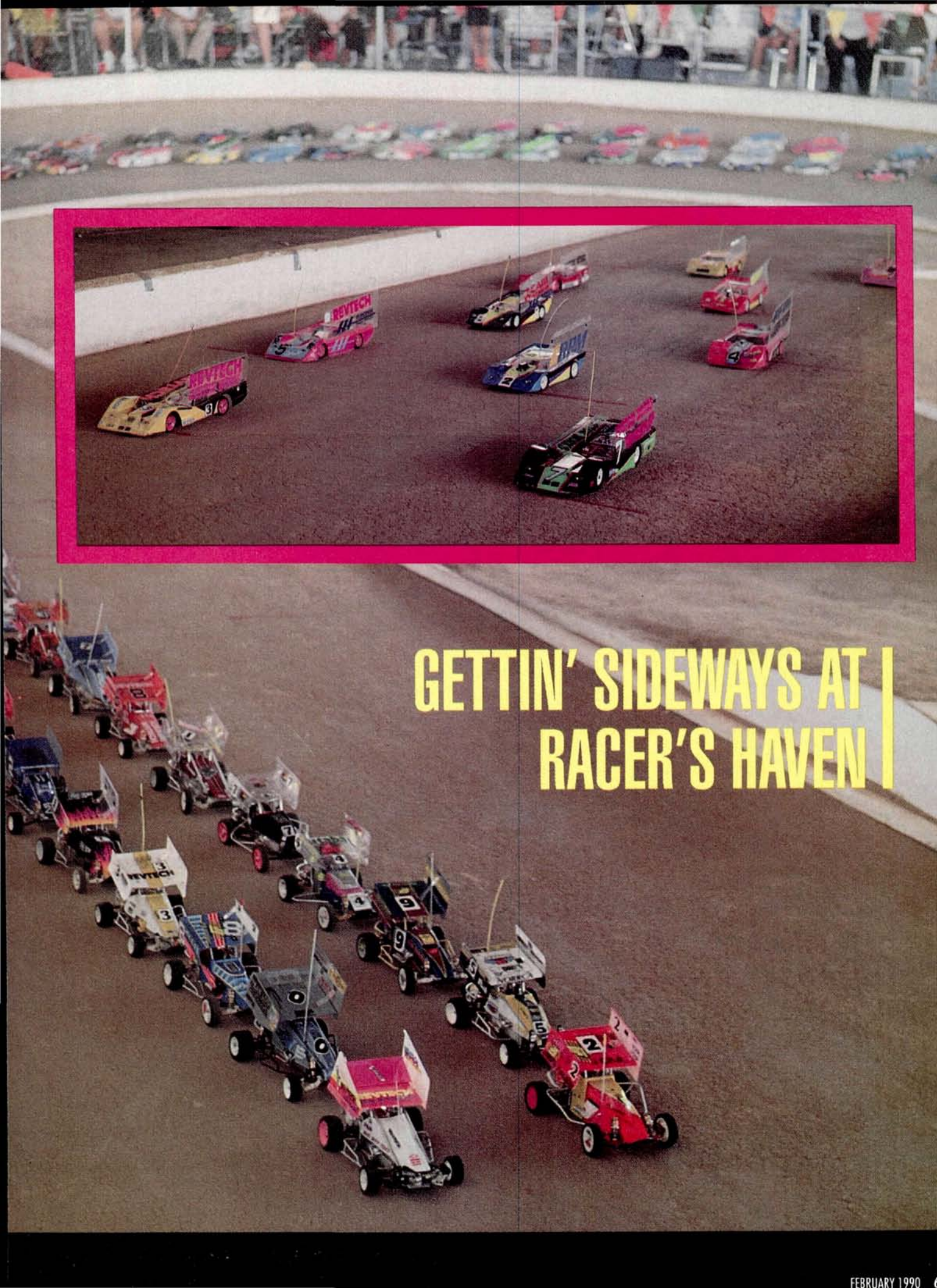
by RICK HOULE

CAN YOU IMAGINE piloting a 3½-pound R/C car at scale speeds of approximately 300mph? It can be a real rush, to say the least, and that's what the country's fastest drivers on the oval circuits were doing August 17 through 20, at Racer's Haven in Bakersfield, CA.

Sunny southern Californian weather greeted many out-of-state drivers who traveled from as far away as Florida to compete on



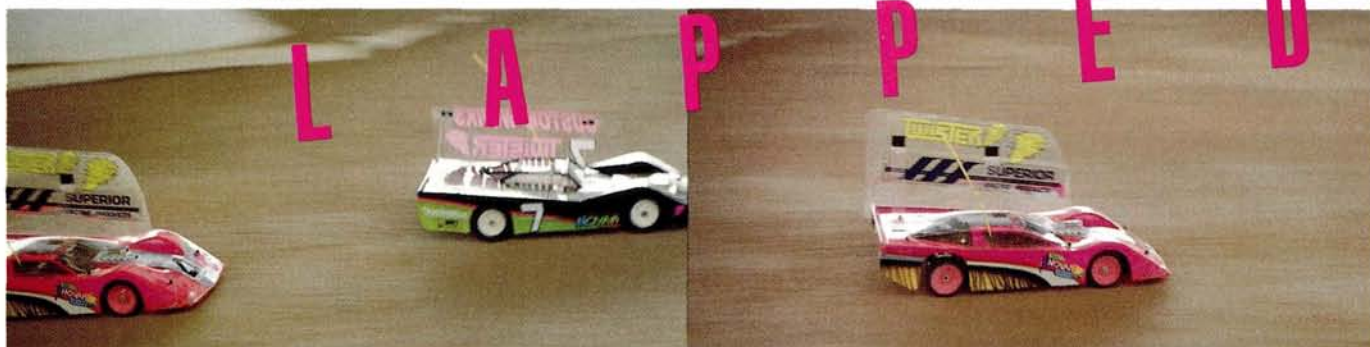
Left: NORRCA 1989 Dirt-Oval Nationals Top Qualifiers (from left): John "Hammer" Smith, Outlaw Sprint; Erik Soderquist, 4WD Open; Charles Reisbol, 2WD Open; Scott Barber, 2WD Stock; and Brian Landgraff, 4WD Stock. Above (right inset): The 4WD Stock starting grid: These cars are just waiting to explode into action!



GETTIN' SIDEWAYS AT RACER'S HAVEN

dirt oval

NATIONALS



4WD Stock TQ
Brian Landgraff
(7) gets lapped
by eventual
winner Sean
Young.

the hard-packed clay race course. Although this was a dirt-oval event, the flat, hard surface required a little on-road technology to make the cars hook up. In the 2WD classes, many of the top qualifiers used direct-drive transmissions, e.g., J-Car and Track Master X-Caliber units. During qualifying, “foamies” were the tires of choice for the front runners, but by the time the Mains rolled around, an interesting mix of tire choices was prevalent. Caps (foam tires covered with a thin layer of rubber) worked well for many drivers. Outlaw Sprinters seemed to hook-up best with rubber slicks on the

front, coupled with treaded tires on the rear.

Racer's Haven is a great facility, with a well-stocked pro shop next to the Revtech office, the Fast Lane pizza parlor and Autographics' home office. The huge, steel roof over the track was a luxury welcomed by the racers, who enjoyed the plentiful pit areas underneath.

The track's surface required only an occasional sweep of the loose stuff that would gather just outside the blue groove. Yes, you read that right! I said, “blue groove”—that's how hard and flat this dirt track was!

The event was highlighted by a meeting of manufacturers and racers, who were called together by NORRCA's president, JR Sitman, to discuss such topics as separate expert and amateur classes in future NORRCA events. The meeting was held inside the Fast Lane pizza parlor, and the spirited debate was fueled by copious amounts of tasty pizza. The manufacturers included: Neil McUrdu (Revtech); Mike Walker (Twister); Carlos Turano (Cheetah); Bill Carter (Losi); Bob Currie (Track Master); Brian Landgraff (Custom Works); and I represented Team Hammer. Some

2WD STOCK A-MAIN (All stock classes ran Revtech motors)

	Name	Chassis/Transmission	Speed Control	Body	Tires (l/r)
1	Scott Barber	RC10/Associated	Novak T1X	Premier Designs	CKW Caps/Bolink Foam
2	Clay Carroll	RC10/Associated	Novak T1X	Custom Works	AJ's Foam/Losi Foam
3	Jon Vandervort	RC10/Track Master	Novak T1X	Premier Designs	Bolink Foam (l/r)
4	Rick Atwood	Thorp/Cheyenne	Tekin Pro	Associated	JG Slicks/Advance
5	Steve McAfee	RC10/J-Car	Novak T1X	JG	JG Slicks/Advance
6	Al Etheredge	RC10/Associated	Novak 4	Andy's	CKW Caps (l/r)
7	Danny Egger	Scratch/Thorp	Victor 4	JG	TRC Foam (l/r)
8	Robert Moss Jr.	RC10/Associated	Novak 4	Premier Designs	TRC Foam (l/r)
9	Sean Sinclair	RC10/J-Car	Novak T1	Premier Designs	Bolink Foam/Custom Works Foam
10	Jorge Takamoto	RC10/J-Car	Novak T4	JG	JG Slicks/Advance

4WD STOCK A-MAIN (All stock classes ran Revtech motors)

	Name	Chassis	Speed Control	Body	Tires (l/r)
1	Sean Young	SRP-1	Novak T1X	Premier Designs	CAM Caps (l/r)
2	Jeff Floyd	Dominator	Novak T1X	Custom Works	Arrow Foam (l/r)
3	Phil McKinney	SRP-1	Novak T1X	Premier Designs	Ufra Foam (l/r)
4	John Jenkins	Dominator	Novak T1X	Custom Works	Losi Foam (l/r)
5	Brian Landgraff	Dominator	Novak T1X	Custom Works	Losi Foam (l/r)
6	Lonnie Coats	SRP-1	Novak T1X	Premier Designs	TRC Caps (l/r)
7	Ciff Copeland	Dominator	Novak T1X	Premier Designs	Arrow Foam (l/r)
8	Greg Banks	Dominator	Victor 4	Custom Works	Losi Foam (l/r)
9	Mark Dunn	Optima	Novak T1X	Custom Works	TRC Foam (l/r)
10	A.J. Patrick	Dominator	Pro-Zeta	Premier Designs	Arrow Foam (l/r)

of the racers included John Hammer Smith, Russ Hawkins, Jim Gouge, Martin Buchanan, Rob Cutman, Joe MacGregor, as well as many others.

The first half hour of the meeting was devoted to deciding how to separate expert drivers from amateur drivers. It was decided that drivers should be classified by their past racing accomplishments. To accomplish this task, NORRCA will compile a list of all major NORRCA events from the last two years and generate a list of experts who won't be allowed to compete against less-experienced drivers.

It was generally agreed that the sport must provide a more inviting climate so that newcomers can compete with confidence and not be intimidated by the heavily sponsored factory drivers at these types of events. Sitman was pleased with the fruitful discussions, and he vowed to incorporate many of the ideas from the meeting into upcoming races next season.

The Concours event was highlighted by Dave Miller's entry: His wedge-bodied car was pulled to the judges' stand on a hand-built trailer by a Clod Buster with a matching color scheme. Unfortunately, Miller's masterpiece only netted him 3rd-place honors. Joe MacGregor won 1st place with

a meticulously detailed scratch-built car that sported a cockpit with an onboard mini-cam. Ernie Prince took 2nd place with another very well-done wedge-bodied car.

On Saturday, the top four qualifiers of each class competed in Trophy Dash races as a warm-up event for the Mains



2WD OPEN A-MAIN

Name	Chassis/Transmission	Motor	Speed Control	Body	Tires (l/r)
1 Eddie Knoles	Cox Scorpion/Fast Eddie	Twister	Victor 4A	JG	CKW Caps/TRC Caps
2 Charles Reisbol	RC10/MIP	Revtech	Novak T1X	Premier Designs	TRC Foam (l/r)
3 Rob Cutman	Terminator/J-Car	Revtech	Novak T1X	Custom Works	TRC Foam (l/r)
4 John Peterson	Scratch/J-Car	Twister	Victor 4A	JG	TRC Foam (l/r)
5 Pat Griggs	RC10/X-Caliber	Twister	Novak T1X	Premier Designs	TRC Foam (l/r)
6 Joe MacGregor	Scratch/MIP	Revtech	Novak T1X	Andy's	TRC Foam (l/r)
7 Tom Clark	TQ-10/Associated	Race Prep	Novak T1X	Andy's	TRC Caps (l/r)
8 Bob Fellenbaum	Terminator/J-Car	Revtech	Novak T1X	Premier Designs	TRC Caps (l/r)
9 Tyler Clements	RC10/X-Caliber	Reedy	Novak T1X	Premier Designs	Track Master Caps (l/r)
10 George Vardzik	Scratch/X-Caliber	Race Prep	Novak T1X	Andy's	TRC Foam/Advance

4WD OPEN

Name	Chassis	Motor	Speed Control	Body	Tires (l/r)
1 Brian Landgraff	Dominator	Twister	Novak T1X	Custom Works	TRC Caps (l/r)
2 Curtis Strawn	SRP-1	Twister	Novak T1X	Premier Designs	Losi Foam (l/r)
3 James Griffith	Dominator	CAM	Novak T1X	Custom Works	CAM Caps (l/r)
4 Rob Bishop	Dominator	Revtech	Novak T1X	Custom Works	Arrow Foam (l/r)
5 Martin Buchanan	SRP-1	Revtech	Novak T1X	Premier Designs	Losi Foam (l/r)
6 Russ Hawkins	Dominator	Twister	Novak T1X	Premier Designs	Losi Foam (l/r)
7 Erik Soderquist	SRP-1	Twister	Novak 1	Premier Designs	Arrow Foam (l/r)
8 Sean Young	SRP-1	Twister	Novak T1X	Premier Designs	CAM Caps (l/r)
9 David Timmerman	SRP-1	CAM	Novak T1X	Premier Designs	CAM Caps (l/r)
10 Scott Quillen	Dominator	Revtech	Novak T1X	Custom Works	Losi Foam (l/r)



Mike Walker (right) receives the Team Cup from NORRCA President, J.R. Sitman.

the next day. With the exception of the 2WD Stock class, the top qualifiers of each class won their respective exhibition races. These drivers were: Clay Carroll, 2WD Stock (Scott Barber TQ'd, though he didn't win this one); Brian Landgraff, 4WD Stock; Charles Reisbol, 2WD Open; Erik Soderquist, 4WD Open; and John Hammer Smith, Outlaw Sprint. During the intense racing of the 2WD Open Trophy Dash, Reisbol set a new track record with a blistering run of 42 laps!

A Best Sportsman award was given to the racer in each class who best showed his unselfish spirit by lending a hand to other racers so that everyone

could enjoy this event. The recipients were: Martin Buchanan (4WD Open); John Hammer Smith (2WD Open); David Markert (Outlaw Sprint); Sterling Banks (4WD Stock); and Jerold Stevens (2WD Stock). Mike Walker, owner of Twister Motors, received a huge "Most Appreciated" trophy for helping to rebuild motors for anyone who asked, regardless of what brand it was.

During qualifying, the AMB scoring system computed the average scale miles per hour (amph) for each contestant. In 4WD Open, Erik Soderquist posted the TQ run of 41 laps in a time of 4:04.13 with an amph

of 277. In 2WD Open, Charles Reisbol TQ'd with a run of 40/4:00.88 with an amph of 274. John Hammer Smith TQ'd in Outlaw Sprint with a time of 36/4:04.89 for an amph of 243. In 4WD Stock, Brian Landgraff ran 240amph and TQ'd with 35/4:00.65, and in 2WD Stock, Scott Barber posted the TQ run of 34/4:03.99 with an amph of 230.

2WD Stock A-Main

Scott Barber managed to break out of the massive pile-up at the start of the race in the point position, and he kept his RC10 with a stock tranny in front of the thundering herd. Clay Carroll fought his way into the runner-up spot with his RC10, but spent the rest of the race trying to pick his way through the back markers that separated him from the leader. At the wire, Barber took the checkered flag, Carroll followed in 2nd, and Jon Vandervort came in 3rd. Rick Atwood was briefly among the leaders with his infamous Cheyenne car, but managed a 4th-place finish in this race.

4WD Stock A-Main

TQ Brian Landgraff took the early lead with his Dominator, but Jeff Floyd and Cliff Copeland were all over him with their Dominators. Sean Young, driving an SRP-1 and starting from the fifth spot on the grid, fought his way up into the runner-up spot behind

(Continued on page 138)

OUTLAW SPRINT

	Name	Conversion/Chassis/Tranny	Motor	Speed Control	Body	Tires (l/r)
1	John Smith	JG/RC10/J-Car	Peak Perf.	Victor 4	JG Mfg	JG Slicks/ Advance
2	Rick Atwood	Cheyenne/Thorp	Twister	Tekin Pro	Premier Designs	JG Slicks/Advance
3	John Peterson	Scratch/J-Car	Twister	Victor 4	MRP Wedge	JG Slicks/Advance
4	Jason Takamoto	Ascot/RC10/Associated	Peak Perf.	Novak T1X	Premier Designs	JG Slicks/Advance
5	Joe MacGregor	Big Boys/RC10/MIP	Revtech	Novak T1	MRP	TRC Foam (l/r)
6	Jim Gouge	RC10/Fast Eddie	Twister	Novak T1	Premier Designs	JG Slicks/CKW Caps
7	Steven Redd	Scratch/MIP	Revtech	Tekin Pro	Premier Designs	JG Slicks/Advance
8	Jim Takamoto	Ascot/RC10/Associated	Peak Perf.	Novak 4	McAllister	JG Slicks/Advance
9	JR Sitman	Big Boy Toys/RC10/X-Caliber	Revtech	Novak 1	McAllister	Bolink Foam/TRC Caps
10	Kevin Steven	Big Boy Toys/RC10/J-Car	Twister	Novak T1X	Big Boy Toys	JG Slicks/Advance

HIROBO

INVADER

WE'VE BEEN INVADED!

by BILL O'BRIEN



THE HIROBO* NAME is probably more familiar to helicopter fans, but this multifaceted company also produces a line of R/C cars, including the Zerda, the Tomcat and the better-known Alien Mid 4. Hirobo pioneered mid-engine, belt-drive technology, and this has resulted in high-tech vehicles, e.g., the four-year-old Alien Mid 4 and its current variant, the Invader. (A third car, the Jealousy, is more high-tech and much more expensive than either the Alien or the Invader.)

The model currently available is the SR, and it doesn't include a speed control or a motor, so you can make your own choices.

THE KIT: One of the first things you'll notice is the package of ball bearings. Although most of the world has settled on 5x10, 5x11 and 4x8 bearing sizes, Invader bearings are almost large enough to be used in full-size cars!

The second startling item is the body. I guarantee that you won't see another like it for a few years. Following the latest trend, the Invader body is a two-part affair, and both the bottom pan and the upper body segments are made of polycarbonate. It's here, however, that the similarity ends. The body is shaped more like a modified Bell Ranger helicopter fuselage (the Airwolf variety) than a typical buggy cover.

The main section has a teardrop shape that closely parallels the shape of the Alien's body, but Hirobo has added wing stubs in the lower-pan and upper sections. It looks as odd as heck, but it's an interesting arrangement that no one else had thought of.

The chassis is a three-part assembly consisting of an anodized metal plate with cutouts for the differentials and a channel for the belt drive, a plastic cover that runs the full length of the chassis and protects the diffs and the belt drive, and the lower body pan. The arrangement is almost a unit-body construction, as the lower body is an integral part of the chassis assembly. Combined with the plastic cap, the two sandwich the mechanicals and maintain rigidity.

Up-and-down motion is handled by four plastic, oil-filled, coil-over dampeners. The suspension uses lower A-arms and upper suspension links at all four corners. Although this is a conventional buggy arrangement, you'll quickly notice that the wheels are anything *but* conventional in design. Standard, spiked, off-road tires (included in the kit) mount on them, but the wheels themselves aren't ridged to hold the tire bead; instead, there's a lip on the outside rim, and the barrel of the wheel is smooth and flat, almost as if it were meant for on-road foams.

I'm thankful that the diffs were pre-assembled. If you tore them



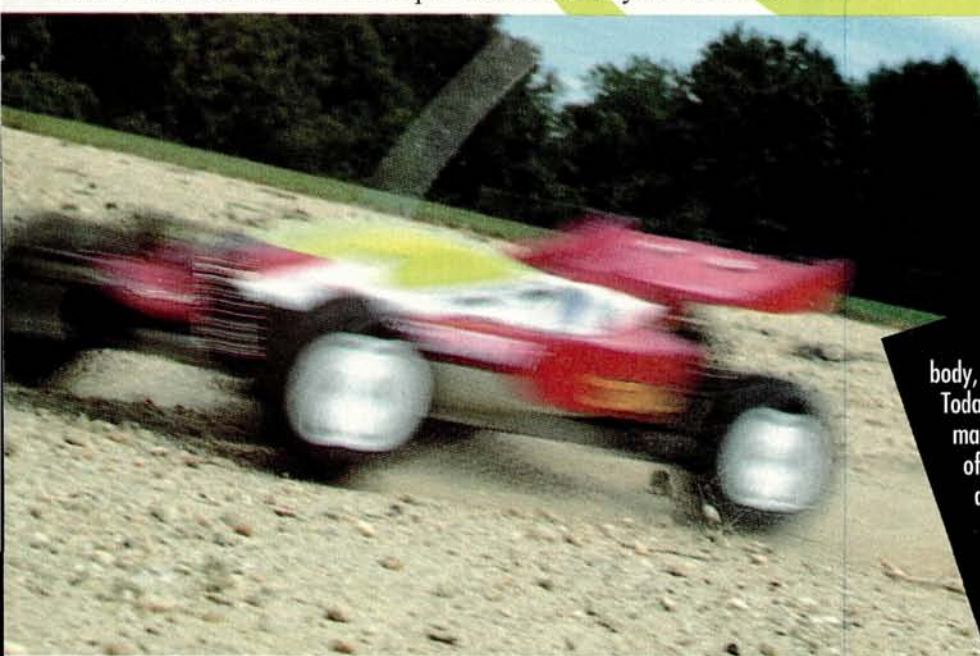
Invader's Alien Relative

IT'S SOMETIMES JUST as important to look at the research and development that went into a car as it is to see the finished product. Luckily, we have that opportunity with the Invader: Just take a look at the Alien Mid 4, Hirobo's other 4WD mid-engine car. When it arrived in the U.S. in '86, it was the first—and only—belt-driven, 4WD, mid-engine car on the market. Its teardrop body design was a radical departure from the conventional buggy bodies of the day. No one knew much about Hirobo, and its distributor at the time, Gorham Model Products, only sold the cars as an adjunct to the Hirobo helicopter line, so the Alien remained largely ignored.

That was surprising because, in '86, the Alien had a list price of \$189, which was slightly higher than average, but the kit included a motor, a mechanical speed controller, ball bearings, a composite-plastic pan chassis and a lightweight, fiberboard radio plate. The chassis pan was even channeled to ensure that nothing would interfere with the operation of the belt-drive system. This all added up to a fast car—even faster than a stock Optima Mid, if both were equipped with similar motors and radio gear.

As fast and as technologically advanced as it was, however, there was no support for the car, and the Alien needed it! The wheels mounted to the hubs with no mounting system heretofore known to humanity. Only 1.6-inch-diameter tires would mount on those wheels. Then there was a silly breakage problem that afflicted the first batch of cars: The front steering knuckles would split suddenly. This could have been caused by an air bubble in the part owing to a problem with the mold. GMP dutifully replaced the part without question and, despite tortures too cruel to describe, my Alien's suspension parts never broke after that.

When you consider all the little things and the lack of performance products (the Alien came with gold anodized metal shocks that performed reasonably well, but for serious business, they had to be replaced), it's understandable that the car has lain dormant since '86. (Mine hasn't! It's on its third body, second set of bearings, fourth set of tires and second rear diff.) Today, it's a different matter. With Hobby Dynamics aggressively marketing the Hirobo car line, and the availability of an abundance of motor options, a choice of competition-class speed controllers, and, thanks to DuraTrax, a selection of tires for different terrains, the Alien has a much better chance of succeeding in the competitive arena. By developing racing differentials, Hirobo could add immeasurably to the car's potential; as it is, however, the Alien Mid 4 is more than enough for most of us racers!

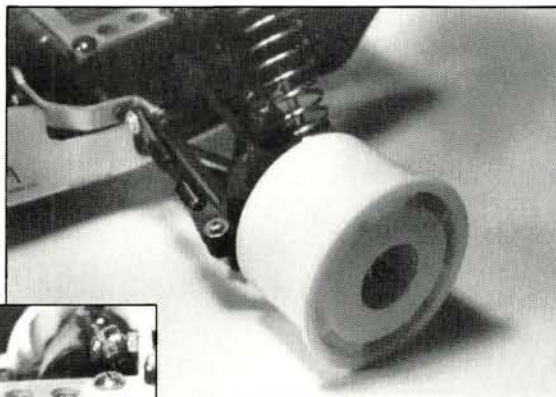


INVADER

down, you'd find that they contain simple spider gears that are pressed onto the stub shafts. If they come apart, don't try to re-assemble them: New diffs are cheap!

ASSEMBLY: Kiss the ground and raise high praise that it's 1990! Just for fun, I pulled out the 1986 version of the Alien Mid 4 manual and compared it with the Invader manual: There's no comparison. Over the past four years, Hirobo has learned how to translate its manuals into relatively clear English. The translation is still too literal in places (when was the last time you used the word "shall"?), but

steps should give you any real problems, but several are tricky, including diff installation. Hirobo wisely uses idler rollers to maintain the belt tension in both diff housings. At first, you'll think that you need four hands to complete the assembly, but that's not quite the case.



The lightweight wheels are one-piece, but there's no bead to seat the tires, so they must be glued on.

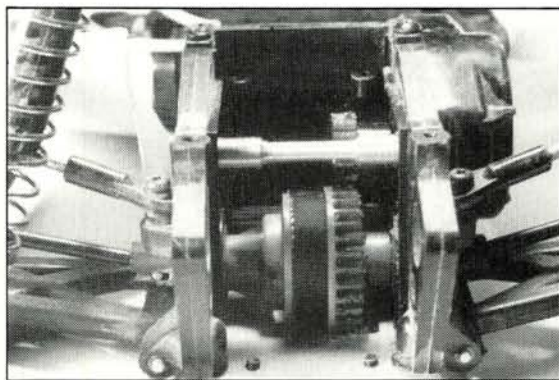


The Invader has a steering rack that allows for precise steering control.

it's *much* better than it was!

The manual's format, too, has changed. Hirobo has come around to the Tamiya way of things and has included full-size illustrations of screws and parts wherever possible. Compared with those in the

Start with the rear assembly. Install all the ball bearings and the ball mounts. (The diff housings are actually individual sides that bolt to the metal chassis plate and are capped by the long, plastic cover.) Bolt the right side of the housing into place (remember that it's a mid-engine buggy, so the motor plate mounts toward the center of the chassis), and attach the drive shaft, the guide pulley shaft and collars, the guide pulley, the cross-member and the single drive gear with the whole assembly leaning slightly toward the right.



Despite the number of cars available with belt drives, the Hirobo cars were some of the first to make use of them. On the Invader, a primary gear drive with a belt connects the front and rear differentials.

older manual, the construction illustrations are smaller, but, overall, it's definitely an improvement.

As for the assembly itself, none of the

Slip the belt around the rear diff and under the guide pulley (it only comes into contact with the top of the belt), then cap it with the left side of the housing, so that everything slides into its appropriate opening. Bolt the left side into place, and you've finished the rear! The front is assembled in the same way, but you have to contend with the steering shaft that's used instead of a guide pulley shaft, and that's the source of your second hurdle.

Like the Alien, the Invader uses a ball-and-rack steering system. The actual rack mounts onto the exposed tips of the steering shaft that protrudes through the front differential housing and encompasses the rear of the

(Continued on page 158)

HIROBO LIMITED

INVADER SR

Type Off-road buggy
Scale 1/10
Sug. Retail Price \$259.95

DIMENSIONS:

Overall Length 15 inches
Width 9.25 inches
Height 5.5 inches
Wheelbase 10.5 inches
Front Track 8 inches
Rear Track 7.5 inches

WEIGHT:

Gross (w/bat.) 59 ounces

BODY:

Type Off-road buggy
Material Polycarbonate

CHASSIS:

Type Tub
Material Anodized aluminum

DRIVE TRAIN:

Primary Pinion/spur
Transmission Gear drive w/belt
between gearboxes
Differential Spider gears
Bearings Ball bearings

SUSPENSION:

Type (f/r) ... Lower A-arms with upper
control links
Dampening (f/r) ... Oil-filled, coil-over
shocks

WHEELS:

Type (f/r) One-piece plastic
Dimensions (DxW) (f/r) 2x1.25
inches

TIRES:

Front/Rear Rubber pin-spikes

ELECTRICS:

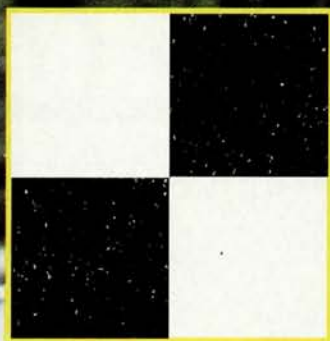
Motor 05/540 (not included)
Battery 6-cell pack
Speed Controller Electronic
(not included)

OPTIONS AS TESTED:

JR Alpina pistol-grip radio and 900 ESC; Trinity Big Daddy motor; Tamiya 6-cell SC battery pack.

COMMENTS:

The Invader is an updated version of the Alien Mid 4 that maintains the basic running gear and suspension. It's stable and handles the jumps well. The improved body, with belly pan and chassis, seems to trap dirt because of a lack of a solid seal. The Alien was an excellent car, and the Invader offers the same quality and performance. Hop-up parts to further improve performance would be appreciated.

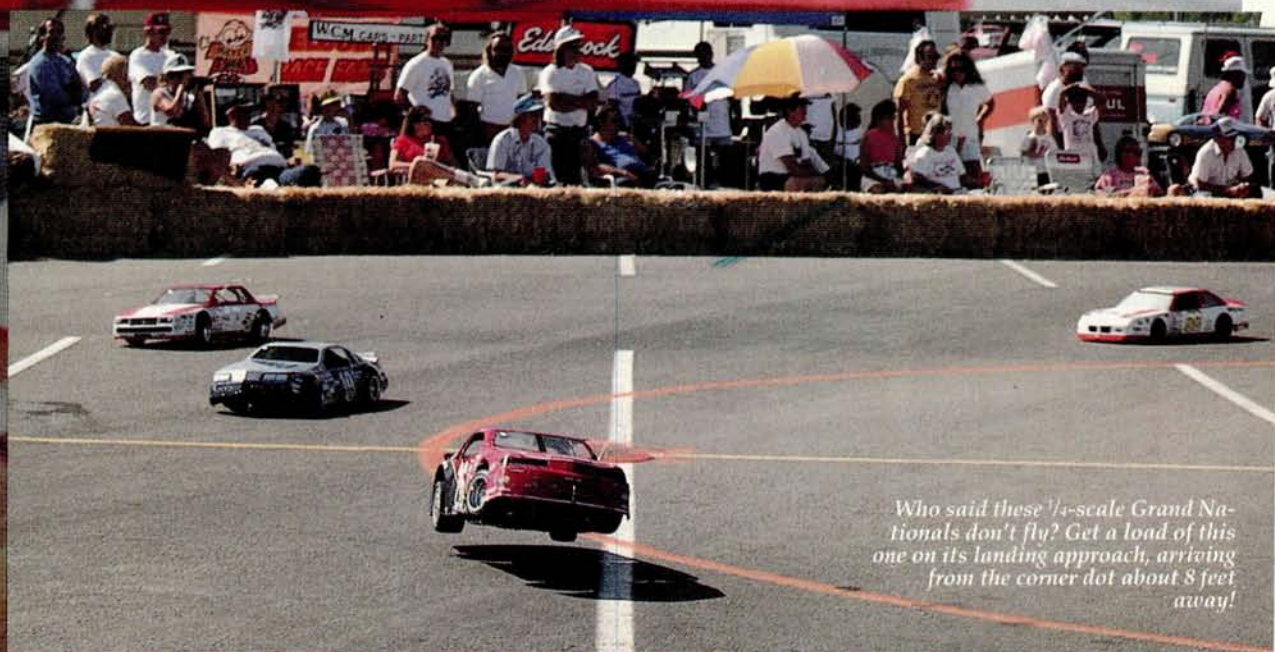


KING

8

S U P E R N A T I O N A L S

**LAS VEGAS
DRAWS
THE BIG BOYS!**



Who said these 1/4-scale Grand Nationals don't fly? Get a load of this one on its landing approach, arriving from the corner dot about 8 feet away!



by STEVE POND

CAN YOU BELIEVE IT? After only three years, the King 8 Supernationals has been accepted as the premier 1/4-scale event of the year!; and for all three years, the racing has been

held in the city that's regarded as the world's gambling capitol—Las Vegas, NV.

Who Came in '89?

Manufacturers of 1/4-scale cars and parts were there to show the 1/4-scale racing world what they have to offer. The guest list included RACO, Alves, Race Craft, Auto Engineering, MK Engineering, B&L Racing, QRS, Skellinger Engineering, Delta Manufacturing, DWA, Gilmer, Edelbrock/Delara Mfg., Winbros, Quickdraw and WCM; all were ready to put their products to the test on what's now considered to be



Clockwise from left: Sharp-looking Gilmer Midget during practice; Neil Schindler walks away with the Concours trophy; Michelle Sharples, Miss King 8, shown with Kenny Higdon's custom King 8 cars; oooops!; some early morning practice preparation.



Clockwise from above: The DWA Commando 1/4-scale motorcycle, driven by Jens Jorgensen; the QRS Stadium truck after "doin' some dots"—corner dots, that is; Grand National qualifying action.



the toughest testing ground for 1/4-scale cars. You might think that the presence of so many manufacturers would dominate the entire program, but they were, in fact, numerically overshadowed by the strong showing of independent racers.

Following the Rules

The King 8 racing program format is from the QSAC rule book (the organization that sanctions the event). Under QSAC rules, the racing is very competitive; the cars all have similar powerplants, so driving and tuning skills hold the key to winning races (not spending the most). The manufacturers' only advantage in races is that they know how their cars work best, so everyone has a reasonably fair shot.

For qualifying, each racer puts in a four-lap solo run, and the fastest single lap time is used to seed them into a later qualifying heat. The heats are set up so that the fastest single-lap quali-

the heats are filled.

The heats are then run, and the finishing order determines where each racer is seeded for the Mains. Again, the winner of each heat goes to the A-Main; 2nd-place finishers go to the B-Main; 3rd to the C-Main, until the Mains have a complete field. Then come the Mains—starting with the lowest and working to the highest.

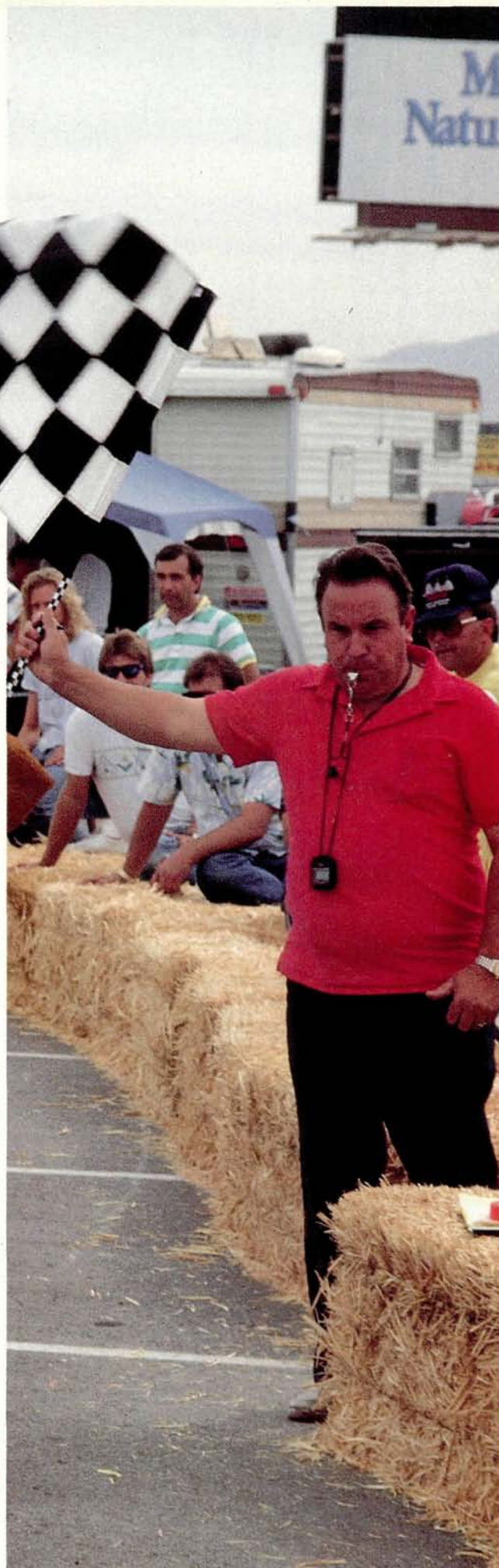
The top three finishers in each Main are moved up to the next one, where they start at the back of the pack. With three slots open in each Main, this procedure continues right up to the A-Main. The beauty of this system is that, even if you run a poor solo qualifier, you can place high in the qualifying heat and still make it to the A-Main. Even if you do poorly for the qualifying heat, you have yet another chance to make the A by



fier is awarded the pole position for the first heat; the second-fastest qualifier gets the pole position in the second heat, and so on. To fill the second starting spots in the heats, this process is repeated, working from the fastest qualifiers to the slowest, until

"bumping up," as it's called, to the next Main. In theory, even if you were the slowest qualifier of the day, you could make it all the way to the A-Main by placing at least 3rd in each of the previous Mains!

(Continued...)





Above: Michelle Sharples (right) and her dad are happy to accept the sharp-looking RACO Supermod from John Rahe (center); mom's raffle ticket won the prize! Right: Starting to line up for the Concours.



Clockwise from right: Waiting for the frequency clip to come back; a young enthusiast exercises his squatter's rights when dad insists they go; Jammin' Jay Halsey getting ready to let it hang out with the 1/4-scale motorcycles (his is about 1/2 scale); lineup for a sprint-car Main; Neil Schindler's Concours-winning car.



WHAT'S THE BEEF?!



IN ANY MAJOR racing event, there's bound to be some controversy about the rules, and the King 8 Supnationals was no exception.

One of the entrants, Jens Jorgensen of Denmark, races for DWA—an Italian 1/4-scale manufacturer. Jorgensen drove the DWA Blu 2 (the only 1/4-scale car available from a European manufacturer). The Blu 2 was once equipped with a 30cc engine and, at last year's King 8, it was allowed to run against the 23cc-equipped cars. This year, the engine's manufacturer changed the design to meet QSAC's 23cc limit.

After passing his car through the pre-race inspection, Jorgensen paid his entry fee and started to race in the Supermodified Class. So everything was peachy, right? Wrong! After a tremendous driving job and a top-notch run from the car, Jorgensen placed 2nd in the A-Main. At the close of the race, however, accusations began to fly that the DWA's engine was really a 30cc. Others began to focus on the fact that the engine was offset too far. The purpose of the engine-offset rule is to prevent racers putting more weight on the left side of the car, thereby improving its handling on an oval track; but many of those who were upset failed to notice that the engine was offset to the wrong side!

If they wanted to play exactly by the rules and declare the car illegal because of the offset, it should have been done during the pre-race inspection. The only other arguable point was whether the engine was legal or not, and this could only be determined during the mandatory engine tear-down of the top three cars.

The engine did, in fact, meet the 23cc limit, but there was still a question of whether the engine fit the QSAC rule that it must be "commercially available." The

engine in the DWA car was significantly different from any of the other engines at the race. It has a number of high-performance features, including: crank induction; a rotary intake valve for more precise fuel metering; and high-volume, fuel-transfer ports—all of which add up to lots of horsepower.

Because the rules are vague, it was decided that, pending a check on the manufacturer's specifications to ensure that the engine hadn't been modified, the results would stand. It was later confirmed that the engine was legal, and Jorgensen retained 2nd place.

Having seen the problems associated with determining the legality of engines, QSAC should clarify its rules on engines. If dimensions and other requirements were published, future disputes would be easier to resolve. By specifying acceptable bore, stroke, timing and compression ratio, and ruling on whether crank porting and rotary valves can be used, uncertainties would be eliminated.

The theory behind the "commercially available" clause was that an engine built for racing would cost much more than the engines being used. To be competitive, racers would be forced to switch to high-performance engines with limited life spans, and this would obviously drive up the price of competing.

The right decision was made: Race officials determined that, because the car passed the initial inspection, the 2nd-place finish would stand; but in the future, the car will have to comply to QSAC rules before it's allowed to race. Let's hope that QSAC will clarify its rules before the next racing season.



(Continued from page 79)

Test Runs

The event started on Thursday with an official day of practicing, although many of the racers showed up earlier in the week to get in some extra track time. Those who weren't on the track dialing-in their cars, walked around to the various manufacturers to pick up some go-fast goodies or get some advice on handling. Even though many of the manufacturers had entered races and were busy setting up their cars, they didn't mind taking the time to talk.

Practicing continued right into the night, as racers "milked it" for all it was worth in preparation for the following day's qualifying.

The Action

At the first sign of daylight on Friday, the unmistakable sound

of "crackling," big-bore, 2-stroke engines disrupted the peace of the morning as racers made a last-ditch effort to cut a few more tenths off their lap times. The overcast skies, which were keeping the track cool and inhibiting traction, brought complaints from West Coast racers as the temperature hovered around 60 degrees (pretty mild by our Northeast standards).

Informal practicing went on until about 9:30, when the big Billy Goat vacuum came out to suck up the tire dust and pieces of hay that were scattered around the edges of the track.

When it was time for the racers to line up for the four-lap qualifiers, you could almost tell which group was scheduled to run first by the pace of their steps. After scurrying to get their cars ready, the racers lined up for the solo runs.

Stepping up onto the spacious drivers' stand one at a time made some less experienced drivers anxious, as all eyes were on them. The large 500-foot track seemed to get shorter with every run as the lap times broke into the 7-second bracket (considerably faster laps than those done in the past). About 140 cars did the four-lap run, and this carried the program right into the afternoon.

Next were the heat races, and this was the first time, outside of practice, that these cars ran side by side for an event. There was some bumping, but drivers' skill produced some pretty blistering laps with the fastest times ever seen at the King 8.

The sprint cars turned in the fastest laps, running in the high 7- to low 8-second range. Not too far behind came the Supermods and the Grand National cars with laps in the low 8-sec-

KING

8

ond range. With only one heat to qualify for the Mains, the drivers gave it all they had, hoping to finish well enough to get into the

A-Main, instead of having to work up from the lower Mains.

Just as with any other race, some drivers had their share of trouble when trying to get their cars to hook-up on the slick asphalt. Tires were an important factor, and racers swapped tires hastily as they searched for the right combination. Unfortunately, some had picked the wrong combination for the qualifiers, and they placed in the lower Mains, but that's racing!

At the end of the qualifying

KING 8 SUPERNATIONAL WINNERS

SPRINT CAR A-MAIN

	Name	Car	Radio	Tires	Fuel
1	George Brazil	Brazil Sprinter	Airtronics	Delta Gold	Methanol/Nitro
2	Ray Luther	Alves	Futaba	Delta Gold	Gasoline/Nitro
3	Gary Kyes	Alves	Airtronics	Team Losi	Alcohol
4	Jerry Epperson	Alves	Futaba	Delta Gold/Alves	Alcohol
5	Roger Newell	WCM	Futaba	Race Tech/Auto Eng.	Alcohol
6	Gary Delara	Edelbrock	Futaba	B&L/Delta Gold	Gasoline
7	John Druskinis	WCM	KO Propo	Rubotek	Gasoline
8	Roger Hollingsworth	Alves	KO Propo	Delta Gold	Methanol/Nitro
9	Lorenzo Benton	WCM	Airtronics	Race Craft/Auto Eng.	Methanol/Nitro
10	Dean Walker	WCM	Futaba	B&L/Race Craft/Diamond	Gasoline

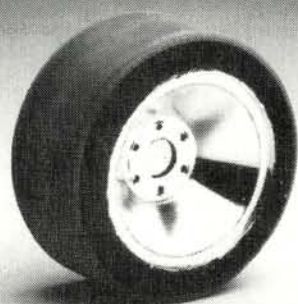
SUPERMODIFIED A-MAIN

	Name	Car	Radio	Tires	Fuel
1	Chris Rahe	RACO	Airtronics	B&L/Race Craft	Alcohol
2	Jens Jorgensen	DWA	Futaba	Ufra	Gasoline
3	Gus Gustafson	RACO	KO Propo	B&L/Race Craft	Methanol
4	Lorenzo Benton	Auto Eng.	Airtronics	Auto Eng.	Methanol/Nitro
5	John Parker	RACO	Futaba	RACO	Gasoline
6	Tom Wilson	RACO	Futaba	Race Craft	Gasoline
7	Paul Disbro	WCM	Airtronics	B&L/Race Craft	Methanol
8	John Rahe	RACO	Airtronics	B&L/Race Craft	Alcohol
9	Van Cox	RACO	Futaba	B&L	Alcohol/Nitro
10	Vince Sansone	WCM	Futaba	Dago	Methanol/Nitro

GRAND NATIONAL A-MAIN

	Name	Car	Radio	Tires	Fuel
1	Chris Rahe	RACO	Airtronics	B&L/Race Craft	Alcohol
2	Toby Stanford	RACO	Airtronics	B&L/Race Craft	Gasoline
3	Gary Kyes	RACO	Airtronics	B&L/Race Craft	Gasoline
4	Scott Johnson	RACO	Airtronics	B&L/Race Craft	Gasoline
5	Dino Mowreader	Helgeson	Futaba	B&L/Race Craft	Gasoline
6	Jay Halsey	RACO	Airtronics	B&L	Gasoline
7	Jay Bowman	RACO	Futaba	B&L/Race Craft/Diamond	Gasoline
8	Mark Beasley	RACO	Airtronics	B&L/Race Craft/Diamond	Gasoline
9	Eric Greco	RACO	Airtronics	B&L/Race Craft	Gasoline
10	Lorenzo Benton	Auto Eng.	Airtronics	Auto Eng.	Gasoline
11	Brian Davy	RACO	Airtronics	B&L/Race Craft	Gasoline
12	Gus Gustafson	RACO	KO	B&L/Race Craft	Gasoline

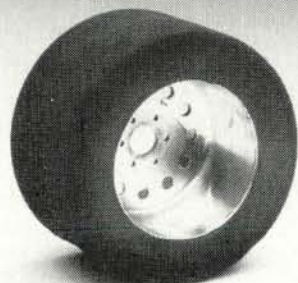
ALVES ENGINEERING One-Piece Plastic Wheels



Alves has finally developed a lightweight, plastic wheel for use on sprint cars with foam tires. Until now, racers glued their foam tires to the stock, two-piece, aluminum wheels that are included with the car. This left the center section of the tire unsupported, and eventually, the tire would fall off.

The new Alves wheels are molded from a strong, lightweight plastic that has a flat surface straight across the entire width of the wheel. There's considerably more surface area for the tire to adhere to, and this prevents premature wear or "chunking." Also available from Alves for 1/4-scale sprint cars is a super-lightweight wing that weighs only 4 ounces. Because the wing's dimensions are at the maximum QSAC limit, it provides excellent downforce with minimum drag.

B&L RACING Aluminum Wheels

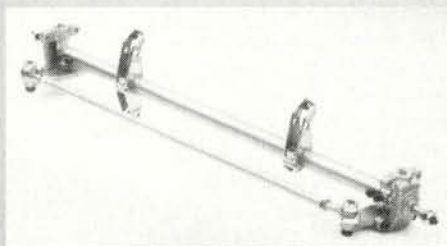
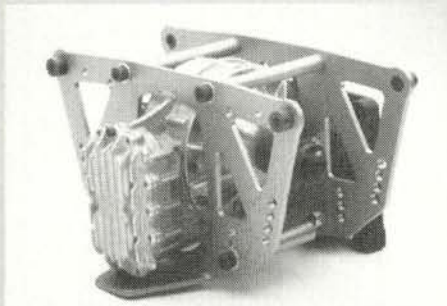
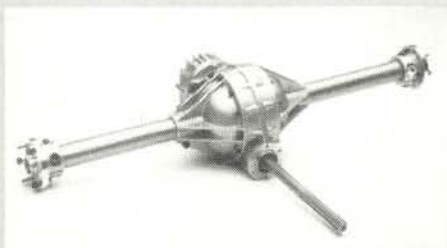


B&L Racing, a manufacturer of top-quality 1/4-scale tires for all types of cars, has introduced its new, lightweight wheel for 1/4-scale sprinters. Sprinters use foam tires more often than other types of cars, but the wheels that come with most kits are inadequate because of the limited surface area to which the tires are glued.

For maximum tire adhesion, B&L's two-piece aluminum rims feature a flat surface across the wheel's entire width. The aluminum construction allows them to run very true, and this translates into faster laps times.

NEW FOR QUARTER-SCALE

SKELLINGER ENGINEERING 1/4-Scale Accessories



Well known for its high-quality Mini-Hallibrand rear end for 1/4-scale cars, Skellinger has introduced three new accessories: a scale Winters rear end for stock cars; a sprint-car front axle; and a Hallibrand rear for RACO Supermods.

The Skellinger Winters rear is scaled down from Winters' actual blueprints, making it virtually perfectly to scale as well as functional. The SECO rear is based on the popular Hallibrand design that has been modified for use in the RACO Supermodified. The Skellinger sprint-car front axle has scale International spindles, which are identical to those used on outlaw sprinters. Their unique bolt-together design allows you to remove all the components if the axle is bent; they can be re-installed on a new section of tubing from SECO (or tubing of your choice can also be used).

MK ENGINEERING New Sprinter and Funny Car



Known for building the fastest 1/4-scale dragsters, MK Engineering has just introduced its new 1/4-scale Sprint Car. Built on a 4130 chrome/moly frame, the MK Sprinter has many of the same features as the full-scale sprint cars, e.g., a Jacob's ladder, a torsion-bar suspension, radius rods for holding the front and rear axles, panhard bars and more. The car is powered by a QSAC-legal Solo engine that develops tremendous power and speed.

If drag racing is your thing, the MK Funny Car is probably the sharpest-looking car on the market; and if performance is your concern, MK Engineering builds the fastest pavement pounders in the world! This car is powered with the 54cc Solo engine that's capable of pushing the car to speeds of more than 70mph in less than 330 feet.

SEES MACHINE 1/4-Scale Wheels



Sees Machine now makes a complete line of ultra-high-quality aluminum wheels for most popular 1/4-scale cars. They can be used on sprinters, Grand Nationals or Supermodifieds. Their construction allows you to change the rim halves to suit tires of any width; immaculate finish!

QUICKDRAW 1/4-Scale Sprinter



Quickdraw's new Sprint Car! Powered by the Zenoah 23cc engine; coil-over suspension instead of the traditional torsion-bar suspension. Clamps fasten accessories to the frame, and this allows quick suspension adjustments. The coil-over suspension is more precise than the torsion-bar setup and will improve handling.

QRS New Trucks



Two new trucks from QRS were displayed at the King 8: a 1/4-scale monster truck and a sled puller. These prototypes have ultra-heavy-duty suspension and rugged chassis. The monster truck was shown with a body like the one used on QRS's stadium racer. For steering, a super-high-torque servo actuates the 4W opposed steering; lawn-tractor-size tires! Unique shaft-drive setup propels QRS's new gear-drive rear end, which is more effective than the older belt-drive system.

The sled puller has a stretched chassis with reinforced, rear, trailing-arm suspension. A stretched body fits over the extended frame, which houses a drive system like the monster truck's.

KING

8

heats, racers again took to the track for practice, but they then had a clearer idea of what they were up against, and tried to match the fast times of the day.

The Saturday Mains were scheduled to start at 11 a.m., but most of the racers were on hand much earlier, either to work on the cars one last time, or to put on the fancy trim for the Concours contest, which is quite a sight. This year, there were some of the sharpest-looking cars ever seen, and this made the judging all the more difficult. Photographs were taken, and the track was then cleared for start of the Mains.

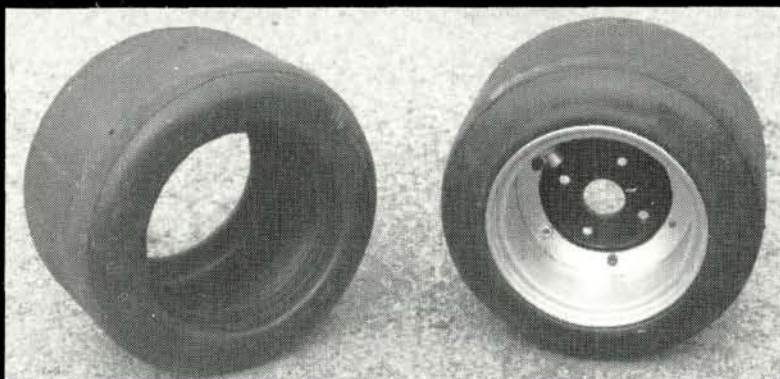
The Grand Nationals started with a few consecutively run Mains, owing to the overwhelming numbers in this class (believed to be the strongest showing ever at a 1/4-scale event). Then, when they caught up to the number of Mains in the Sprint and Supermod Classes, the Mains were alternated to allow those who were able to bump up to the next Main time to check their cars and refuel before the next Main. Each of the lower Mains was 20 laps, with the exception of the stock cars, which ran 25 laps. For the A-Mains, the sprinters and supermods went to 30 laps, and the stock cars were slated to run a 150-lap feature!

The first A-Main was the sprint cars. The starting roster was filled with familiar names, such as Gary Kyes, George Brazil, Gary Delara, Roger Newell and Lorenzo Benton.

In the Sprint-Car Main, a first-lap tangle in the first turn put top qualifier Dean Walker out of the race as he tangled with Jerry Epperson. The restart saw a tightly knit pack consisting of Kyes, Delara, Ray Luther and Brazil, who jockeyed for the lead. For some time, Delara was in the lead, but he couldn't hold off Luther and Brazil. Kyes, who had managed to weed his way through the pack from 8th place, was closing in on the 4th spot and running strongly. Delara, who was running well

(Continued on page 179)

1/4-SCALE TIRE TECHNOLOGY



To add support to the tread area, the P.M.T. pneumatic tires from Italy feature a cord molded into the tire.

Twenty- to 30-pound cars traveling at nearly 40mph can make heavy demands on tires. At the third annual King 8 Supernationals, it was obvious that tremendous strides had been made in 1/4-scale tire technology.

WCM's Diamond Back tire (one of the new breed of cap tires) seems to have an incredible bond between the cap and its base. These tires get their name from their unique diamond tread pattern in the rubber of a fresh tire. The tire's base is very forgiving, but not too soft, and the band compound provides good traction and excellent wear. Diamond Back tires were seen mostly on stock cars, but they were also used on some sprinters and supermods.

Gold tires from Delta (one of the leaders in 1/8-scale racing rubber) were the hands-down favorite foam tires at the King 8. While much tire technology is moving toward solid rubber, these foams are still the most widely used sprint-car tires. For a

foam tire, their durability is excellent, and they stick well, even on slippery asphalt. Although they were seldom seen on stock cars, they were used on supermods.

Running strongly since the last King 8 race, B&L Racing still makes its super-scale rubber Goodyear tires. Apparently having softer compounds for improved traction, these tires

were seen on stock cars and on the front of many sprint cars. They come in sizes to fit just about any application, and they're available as pneumatic tires, or they can be stuffed with a foam liner.

Although there wasn't too much information about the new P.M.T. tires from Europe, they were displayed at the King 8 by Jens Jorgensen, and they looked very promising. These rubber tires have some type of cord molded underneath the tread (similar to full-size car tires), and this allows the use of softer rubber compounds without weakening the tire's center section. Although it's a pneumatic tire, it shouldn't require excessive inflation.

Alves Engineering also showed up with a new tire, and many of the faster sprint-car drivers used it on their outside front wheels. Mounted on Alves' new, light-



The Alves cap tire was used as a front tire on the sprinters. The tires appear to have a gum-rubber-like cap.

weight, plastic wheel, these tires have a foam base and a gum-rubber-type tread.

Race Craft (one of the pioneers of cap tires for 1/4-scale cars) showed a new, softer band for its tires, called the no. 300 band. These tires were used successfully on both the stock cars and the supermods.

SCOPING OUT

by JOHN RIST

Panda PSC-2: Get that extra zip!

It seems that all the R/C car "experts" recommend that you replace your mechanical speed controller with an electronic speed controller. What makes an electronic speed controller such a hot item? It has four main advantages:

- It's easier to install, and good ones are more reliable than mechanical speed controllers.
- The "on" resistance of a good seven-FET electronic speed controller is lower, so it delivers more power from the battery to the motor.
- The throttle response of electronic speed controllers is smooth and continuous from "stop" to full "on," but mechanical speed controllers operate in two or three stages.
- Your battery will last longer with an electronic speed controller.

The reason for the last two advantages is that a mechanical speed controller is really a switch that switches two or three resistors in or out as you advance or let up on the throttle. When you're at full throttle, all the resistors are bypassed and the motor is connected directly. Unfortunately, when you're going at half throttle, there's a resistor in series with the motor, and it's wasting half the power and getting very hot.

On the other hand, the electronic speed controller is really a switching regulator: When you're at half throttle, the electronic speed controller is switching on and off rapidly. At half throttle, it would be on half the time and off the other half. In this way, you can deliver half the energy of the batteries to the motor without wasting 50 percent of it in a dropping resistor. By varying the time "on" against the time "off," you can get a smooth throttle response all the way from "stop" to "hot." Here's another contender in the speed-controller market: the Panda* PSC-2.

As soon as I opened the package, I saw that the Panda PSC-2 was packaged in two parts: One part is the speed controller



The PSC-2 is Panda's new forward only speed controller. It comes with a separate pulse-checker unit to set neutral and top end.

and the other part is a pulse-checker. The Panda PSC-2 has the familiar neutral and high-speed adjustment screws on its face, but it doesn't have the usual built-in LED to indicate full "on."

The instruction book also came in two parts: the regular instruction book and a correction sheet! A comparison of the two revealed a lack of clarity in the instruction book, but the correction sheet is first-class and clears up several points. The correction sheet's hook-up diagram and the diagrams for installing the controller in a car are quite good.

The Panda PSC-2 is a racing-type speed controller, so it has forward and brakes, but no reverse. The Panda PSC-2 does, however, have a full set of connectors. The motor connector is the bullet type, and the battery connector is a Tamiya-style connector. Most R/C car racers prefer either the better silver-plated connectors (e.g. those from Sermos Powerpole), or they wire the motor and battery directly using solder joints instead of connectors.

The problem? In the instruction book, Panda flatly says, several times, that if you replace the connectors, you'll void the warranty. I recommend that you run the Panda PSC-2 with its original connectors for 30 days (the length of the warranty),

and then replace the battery connector with a Sermos Powerpole connector; at the same time, replace the motor connectors with Race Prep gold connectors. I usually hard-wire my motor to the speed controller, but since the Panda PSC-2 has a separate pulse-checking unit that requires you to disconnect the motor, it would be better to run a motor connector with the Panda.

One last problem with replacing the connectors: The battery and motor wires aren't properly color-coded. There are two red wires and two white wires coming out of the controller. As in all forward-only-with-brake speed controllers, the two red wires are tied together inside the controller and are interchangeable, but the two white wires *must not* be swapped. Swapping the battery and the motor wire brings certain death for an electronic speed controller. To avoid the danger of swapping these wires, remove and replace the connectors one at a time; and if you use a different type of connector for the battery and the motor, there can be no mistake.

As always, I hope you have a good local hobby shop where they can help you with this kind of problem. I did remove the Panda PSC-2 from its case, and I found that the workmanship inside was excellent. The parts weren't packed in

SCOPING OUT

quite as tightly as I've seen them packed in some other electronic speed controllers (this means that the controller could have been smaller), but the extra room has allowed Panda to build a rugged-looking unit.

Lab Tests

My lab consists of an oscilloscope, a digital volt-meter, a resistor load bank, and a 6V 30-amp lab supply. The oscilloscope is used to monitor the controller's output so that I can guarantee that the controller is fully on. The digital voltmeter is used to take all the voltage-drop readings and to verify the current-meter reading. The resistor load bank is a bank of 40, 12-ohm 5-watt power resistors that can be switched on and off, one at a time, to vary the load between .6 amp and 20 amps.

In series with the resistors, there's a 25-amp Simpson current meter and a 1-percent, .01-ohm resistor. By measuring the voltage drop across this resistor, the current-meter reading can be double-checked. Of course, the lab supply supplies the test current.

When testing racing-style speed controllers that come with battery and motor connectors, I run two tests. First, I measure the voltage drop from battery connector to motor connector, including wire. Then I use needle probes to measure the voltage drop at the 2-inch point on the wires. I chose this length of wire because it's the minimum length at which a controller is acceptably "direct-wired" to a car.

The measured voltage drop for the connector-to-connector test at 12 amps was .26 volt, and this yields a resistance of .022 ohm. The measurement at the 2-inch point produced a drop of .11 volt at 12 amps—a calculated resistance of .009 ohm. This compares very closely with manufacturer's specified value of .007 ohm. (Panda gets an "A" for truth in the spec-sheet department.) As you can see, the stock connectors and the excess wire account for half of the loss in a speed controller.

Next, I raised the current to a hefty 17 amps for 15 minutes. There was no cooling air or heat sink. The Panda did get hot, but it didn't stop delivering the 17 amps, or suffer any damage. With the right amount of cooling air, under normal use, the Panda PSC-2 shouldn't have any overheating problems. For the really hot motors being driven by a 7-cell pack, the

PANDA

PSC-2

DIMENSIONS:

Height.....	.62 inches
Width.....	1.5 inches
Overall Length.....	1.61 inches
Weight (w/out wires).....	1.5 ounces

TUNING:

Access to Controls.....	Good
Ease of Adjustment.....	Good
Sug. Retail Price.....	\$129.98
Warranty.....	30 days

ELECTRICS:

(Manufacturer's Specs)

Max Voltage.....	8.4 volts
Min Voltage.....	6.0 volts
Max Current Forward.....	450 amps
Continuous Current Forward.....	150 amps
Resistance.....	.007 ohm

TEST PARAMETERS

Voltage.....	6 volts
Current.....	12 amps
Voltage Drop.....	.26 volt
Resistance with Connectors.....	.022 ohm
Voltage Drop, 2-inch wire.....	.11 volt
Resistance, 2-inch wire.....	.009 ohm

COMMENTS:

The Panda PSC-2 is well built, and it's a consistent performer, with good acceleration, excellent top speed and smooth throttle response. It withstood the lab torture test quite well. Half the voltage loss was caused by the stock connectors. The separate pulse checker was dead on, but it might get lost in a crowded toolbox. The color for the negative motor and battery leads is the same, which can cause confusion and, if reversed, the speed controller and batteries could be damaged.

standard Tekin heat sink fits the Panda.

All electronic speed controllers are eventually exposed to a dead short, the most common cause of which is a cooked motor or a jammed gearbox. I put a dead short across the Panda PSC-2 to see if it would survive. Things became so hot it was scary, but the PSC-2 survived.

When running high-powered electric cars, it pays to use a little common sense if the car won't run. Try to find the problem rather than holding the pedal to the metal until the smoke pours out. The controller may survive, but I've seen battery packs literally destroy themselves and the car.

When I tested this speed controller, the summer racing season was over in Huntsville, AL, so I mounted the Panda

PSC-2 in my Turbo Ultima. I followed the diagrams shown on the correction sheet and found them quite good. The installation was straightforward. When adjusting the neutral and the high-speed adjustments, I found that even the supplied screwdriver was of a good quality. Right now, the Turbo has a Twister stock motor in it, and I'm running a 6-cell battery pack. The dirt-track tires were removed and street tires installed instead.

With this nifty setup, I headed off to the local school's parking lot. I dumped several battery packs through the Panda PSC-2 and also let half the kids in the school yard drive it. The Panda had good acceleration and excellent top speed; its throttle response was smooth. (Even inexperienced drivers had no trouble going slowly.) The braking action was quite strong. The young drivers were all amazed at the speed of my car compared with those of others they had driven. They enjoyed jamming on the brakes and watching the car spin out!

The Panda PSC-2 is a well-built speed controller that performs consistently well. Its "on" resistance of .009 ohm isn't the best I've ever seen in a seven-FET speed controller, but it's up there near the top of its class.

I don't like the separate pulse-checker. Extra gadgets tend to get lost in my full workshop, and the pulse-checker makes it impossible to direct-wire the motor, because the motor must be disconnected to use the pulse-checker, which, nevertheless, worked quite well. The change from green to red was right on the money for indicating full throttle.

Other problems are that the Panda PSC-2 lacks proper battery and motor wire color-coding and that the warranty is "void" if you replace the connectors. Half the fun of any hobby is trying to make improvements.

If you're running a mechanical speed controller, you might consider giving the Panda PSC-2 a try. It may add the zip and run time that will permit you to up your gear ratio a couple of teeth and make your car competitive in that big upcoming race.

**Here's the address of the manufacturer featured in this article:*

Panda; distributed by Global Hobbies, 18480 Bandidier Circle, Fountain Valley, CA 92708. ■



Supermodified *PULLERS*



TAMIYA TRUCKS STRETCHED TO PULL

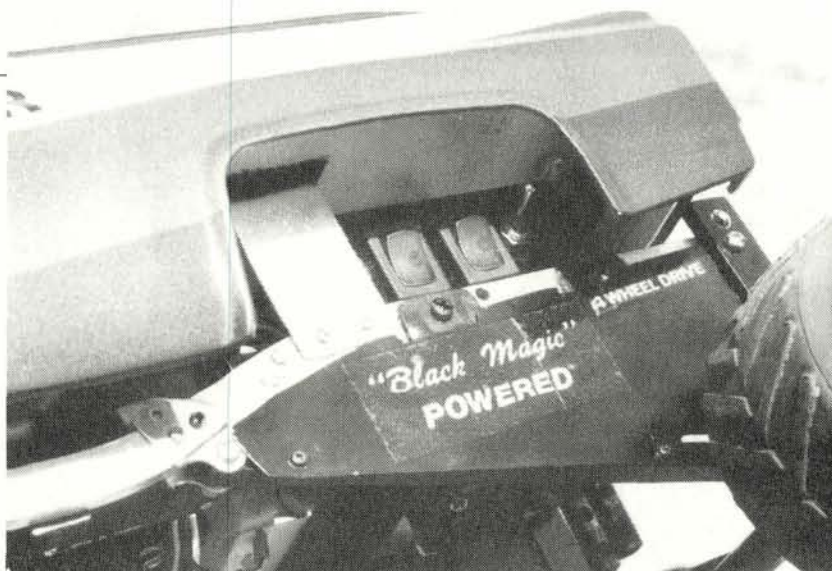
by DAVE SPROUL

IF YOU'RE a fan of pulling, you've probably experienced a blown nitro-burning 4WD supermodified at least once! A few years ago, these trucks were quite popular on the professional pulling circuit, but they dropped from view when the class was eliminated from most events. Recently, however (and much to the delight of pulling fans), these radical machines have returned to the circuit, and they can now be seen frequently at major pulling events.

Supermodifieds are easily identified by the location of the rear axle (under the rear bumper) and the blower that sits atop the mega-motor! Seeing one on television is great, but experiencing one up close is something you *never* forget. The feeling and sound of brute power is *awesome!*

As the R/C sport of pulling progresses, we're seeing some really interesting scale machines, some of which have been built to resemble their full-size counterparts as closely as possible. The trucks you see on these pages are two of the most realistic R/C vehicles currently competing in R/C pulling events. They're similar, but have differences in their construction.

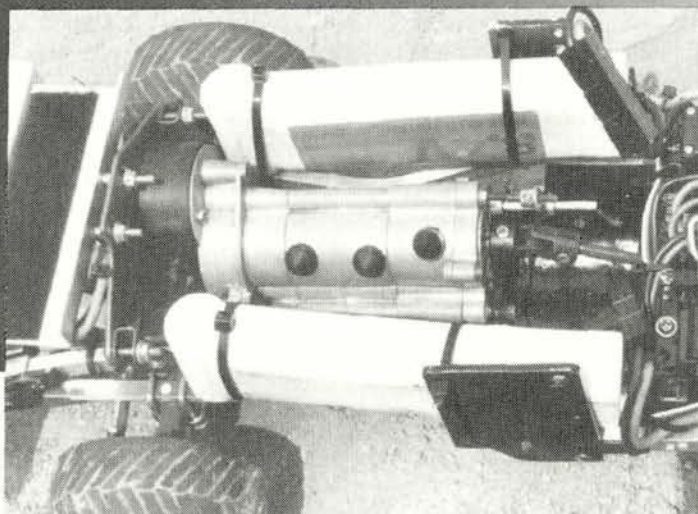
Midnight Madness is owned by Jon Freed of Baden, PA, and it began life as a Tamiya* Bruiser. The Enforcer was built from a Tamiya Toyota Hi-Lux, and it belongs to 15-year-old John Sproul of Beaver, PA, who did all the work apart from modifying the wheels.



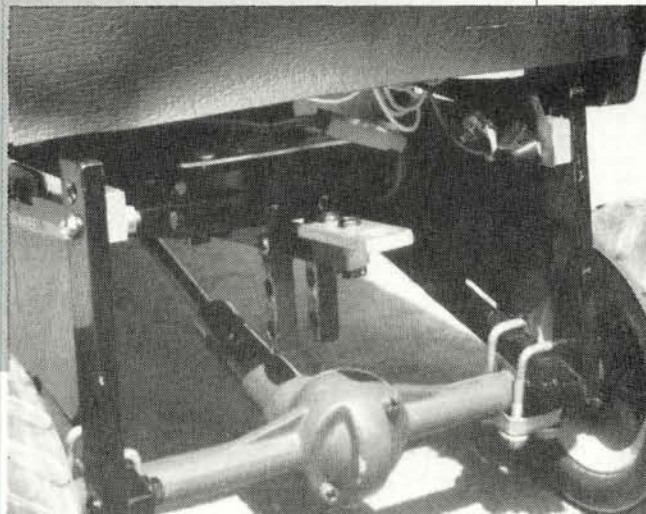
Dual rocker switches, used for shutting down the main batteries, are located under the left rear wheel opening for easy access.

Some of you will remember the Toyota Hi-Lux as the forerunner of today's Bruiser. The vehicles are almost identical, but have different frame material, wheels, tires and motors. The Hi-Lux came with an aluminum frame and a 540 motor, while the Bruiser is equipped with a stamped frame and a 750 motor. Both have a 3-speed transmission.

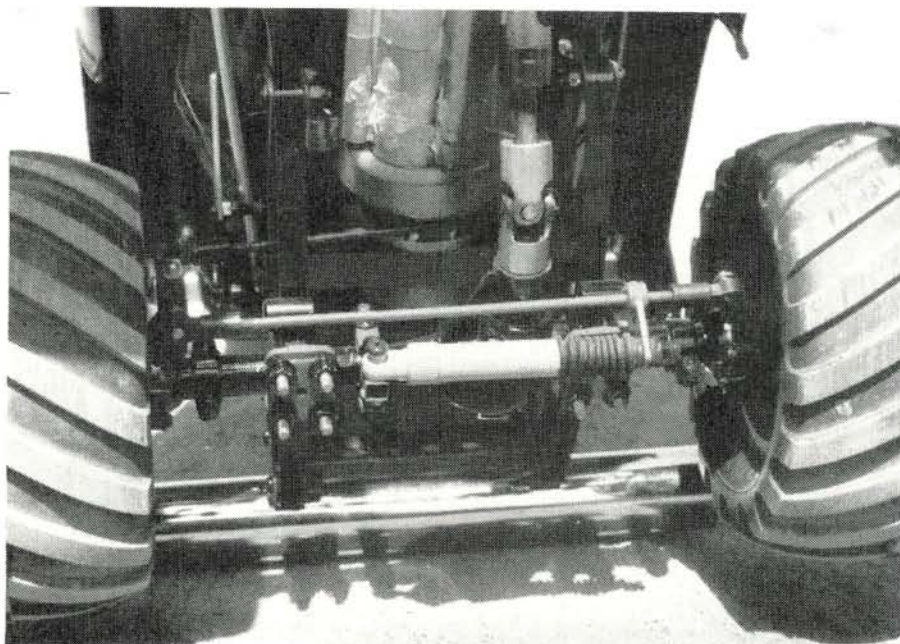
Midnight Madness (named for its color and the many late nights it took to build!) retains the stock steel frame with scratch-built, solid, rear-axle mounts and handmade adjustable hitch. Stock, front, leaf-spring suspension with oil-filled shocks was retained, and a steering stabilizer shock was added to reduce torque-steer under power. A piece of chrome tubing was filled with lead to make a weighted bumper, and



Twin 7-cell battery packs straddle the Hi-Lux three-speed transmission. Note the Velcro body mounts on homemade brackets.



Rear view shows heavy-duty axle mounts and hitches.



Steering damper attached to the tie rods helps correct torque steer.

Supermodifieds are easily identified by the location of the rear axle and the blower that sits atop the mega-motor!

Power is again supplied by 14 cells, and Black Magic's no. 7001 pulling motor feeds the transmission. Futaba's Magnum Sport radio was chosen to handle the driving chores. John also chose the excellent Chevy

this was bolted to the front frame rails.

Power is supplied by a Black Magic* no. 7001 pulling motor and two 8.4V battery packs. The transmission was slightly modified to fit the 05-size motor, and the batteries were mounted as far forward as possible under the body.

The tires and wheels came from a Tamiya Lunch Box van; they're sealed and filled with air. The wheels were modified to fit the Bruiser hubs, to which aluminum "moon" discs were added.

Jon chose a Clod Buster Chevy body for its accurate, molded details, and he treated this body to a coat of Testor's* gloss black, which he lettered in gray. The bed is covered with fiberglass sheet that's sprayed flat black to resemble a tonneau cover. The body mounts are Velcro, so the body can be easily removed and has a "no-holes" look.

Midnight Madness is controlled with a Futaba* radio and is usually left in low gear for pulling. Jon pulls in the National Radio Control Truck Pulling Association's (NR/CTPA) 4WD Open I Class, and his combination has been quite successful, taking home numerous 1st- and 2nd-place ribbons.

The Enforcer has also been successful; it took a ribbon on its very first pull. Again, the rear axle has been relocated rearward using square brass tubing for mounts. An adjustable hitch made of solid 1/4-inch steel bar stock was installed. The stock front suspension was retained with the original leafsprings. A piece of square aluminum tubing was cut to length, filled with lead and fitted to the front of the truck to add weight. The batteries are also located toward the front, under the body.

body from Tamiya.

The overall paint scheme was inspired by the California street-truck scene. John painted the body with Testor's light blue, maroon and green, used the same colors for the grill, and then added details. The Enforcer's tonneau cover was made from black vinyl material that was glued to a fiberglass sheet fitted to the bed. Velcro was chosen for body mounting.

The wheels came from Tamiya's Lunch Box, but they were narrowed to accept DuraTrax* no. 5100 split-V paddle tires with shaved tread, and then modified to fit the Hi-Lux hubs.

The Enforcer also pulls in the NR/CTPA 4WD Open I Class, and it's very competitive. On his way to 1st place in a recent pull, John destroyed the transmission, and he plans to replace it with a secret, heavy-duty, 2-speed unit.

While these vehicles won't shake the ground under your feet or sound like thunder, they're very realistic, both in their appearance and in performance. Since most of us can't afford a full-size puller, this is a viable way of enjoying a radical supermodified! Next time you see one of these awesome machines on television or at your local pull, *think R/C* and build your own radical puller!

**Here are the addresses of the companies mentioned in this article:*

Tamiya/MRC, 200 Carter Dr., P.O. Box 267, Edison, NJ 08818.
Black Magic; distributed by R/C Research Engineering, 7517 10th St., Stanwood, MI 49346.

Testor Corp., 620 Buckbee St., Rockford, IL 61101.

Futaba Corp. of America, 4 Studebaker, Irvine, CA 92718.

DuraTrax/Great Planes Model Distributors, 1608 Interstate Dr., P.O. Box 4021, Champaign, IL 61820. ■



NEW



F O R



1990



NEW FOR 1990

R/C car racing has come around the final turn in the '80s and taken the green flag to head into the '90s. Screaming down the front straight into the early months of the new decade are a host of manufacturers who are ready to show what they have under the hood. We at Car Action have toured pit road to discover some of the more significant goodies that they're preparing to install in their product lines as they race through the '90s.

Here's a small sample of the products that should be hitting the shelves this year.



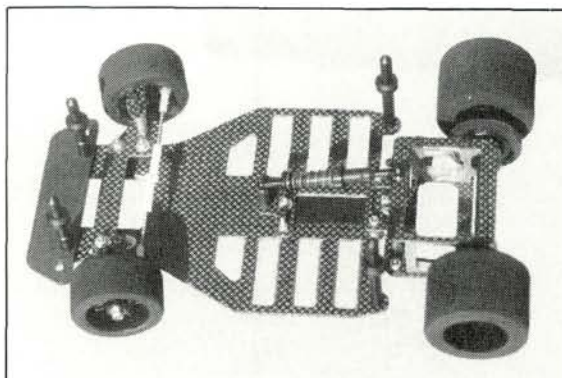
SLAMMIN' INTO THE '90S

ADVANCE ENGINEERING MAGNUM 8

The new Magnum 8 from Advance Engineering is one of the new, 1/8-scale, electric on-road cars. It has some of the same suspension components, tires and radio gear as the 1/10-scale cars, but because the Magnum is 1/8 scale, it's slightly larger and therefore easier to control. In the rear, the Magnum has a five-link, dual-shock suspension system. While 1/10-scale purists argue that 1/8-scalers are too heavy, these cars aren't, in fact, much heavier than the smaller ones and should turn quick lap times.



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ADVANCED RACING TECHNOLOGIES AGITATOR XII

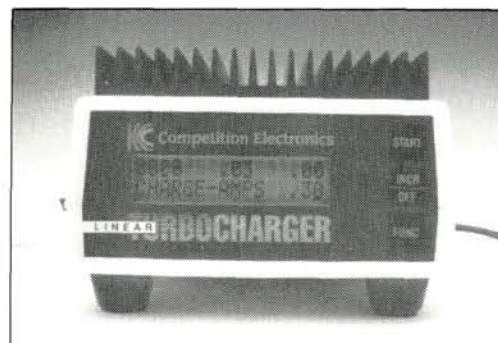
Although the Agitator XII is very new and doesn't yet have many wins to its credit, preliminary reports are that it threatens the domination of Associated's 12L. While many of its features resemble those found on other competitive 1/12-scale cars (i.e., its graphite chassis plate, ball diff, adjustable wheel base etc.) the XII has the same rigid front-end design as the 1/10-scale Agitator. This front end provides exceptional support for the kingpins, and this keeps the wheels vertical through tight turns. Keep an eye on this one in 1990.

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COMPETITION ELECTRONICS LINEAR TURBOCHARGER

One of the more advanced chargers on the market, the Turbocharger is something of an all-in-one unit, combining a peak charger, a discharger, a multimeter and a cell matcher. Hard-pulse technology has been used in many peak chargers and is also used in the original Turbocharger, but it was discovered that this wasn't the best way to charge SCE batteries.

The new Linear Turbocharger uses the latest linear charging technology, which supposedly charges the SCEs more efficiently and with less risk of damaging the cells by pulsing too hard. With the exception of trickle-charging, the linear version has most of the features of the original. The linear version discharges single cells at a 10-amp rate, instead of discharging at 4 amps and then converting to a 10-amp rate as the original version did. This allows more precise cell matching.



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KO PROPO EX-1 PRO

New from Global Hobbies is the KO Propo EX-1 Pro radio. Although it hasn't had much exposure in the States, the top racers who have been using them say they're very comfortable and functional.

Among the EX-1's features are steering end-point adjustments, a steering-rate thumb wheel, exponential throttle, steering and throttle-trim levers, sub-trim pots and brake adjustment.

There are three versions of the EX-1, one of which should be suitable for just about any application. The EX-1 Pro Standard version includes: two PS-301H ball-bearing servos, a KR-285A mini-receiver and a BEC switch harness. The EX-1 Pro On-Road version includes: a PS-901BH ball-bearing miniservo, a CX-4 electronic speed control with heat sink, and a KR-285A mini-receiver. The EX-1 Pro Off-Road system includes: a PS-303 FET high-speed servo, a CX-4 electronic speed control, and a KR-285A mini-receiver.

TAMIYA ASTUTE

For 1990, Tamiya is aiming at the high-performance end of the market with its Astute 2WD off-road car. Tamiya's most serious effort at capturing the 2WD market to date, the Astute has a number of features never before seen on a Tamiya car.

The Astute is the first Tamiya car to include a ball differential. Also unique to the Astute are bronze bushings at all the suspension pivot points (to prevent wear caused by extended use) and a fiberglass chassis. This chassis supports a suspension system not unlike those of today's top 2WD cars (long front A-arms, adjustable linkages and bellcrank steering). The Astute also includes a 70- and 77-tooth spur gear and optional pinion gears in the 16- to 23-tooth range, and this wide range of gears means the car can be tuned for a variety of track sizes and conditions.



TAMIYA EGRESS 4WD

Yet another surprise from Tamiya in its new line of off-road cars for the 1990s!—the Egress 4WD, which is the most competition-oriented car ever built by Tamiya. Much of the plastic seen in other kits in the line has been replaced by lightweight alloys and composites.

The chassis is a two-piece carbon-graphite unit. The main lower plate is where all of the suspension components are attached, and the upper plate adds rigidity to the whole chassis. Also included are titanium screws and aluminum nuts for additional weight reduction. As with other competitive off-roaders, a pair of ball differentials (one front and one rear) transfers the power to the wheels. Go-fast goodies like ball bearings and one-piece wheels are also included in the Egress, and a full range of optional gears is available. Tamiya appears to be taking a new approach in 1990!



TEAM LOSI JR-XT MONSTER TRUCK

Every year, at around this time, R/C car enthusiasts look to see what's in store for the year ahead. One newcomer that caught us by surprise is the JR-XT ("T" meaning truck) from Team Losi.

As one of the most competitive off-road cars on the market, the JR-X2 has been the subject of many truck conversions, so it makes sense that Team Losi has introduced its own truck kit that eliminates the cost of the conversion kit.

The kit uses the technology that was developed for the JR-X2, and it's combined with Team Losi competition-developed parts in the ultimate racing monster truck. A long-wheel-base, carbon-fiber/graphite chassis is included as is Losi's unique five-link rear suspension. Keep an eye on this one; it will be a tough truck to beat.

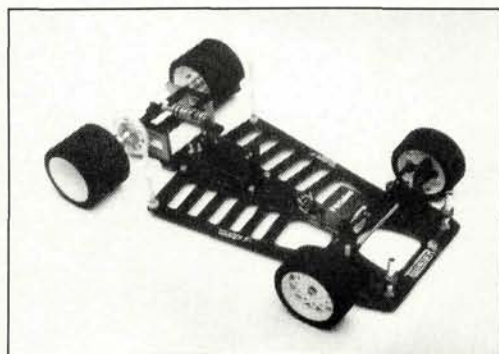


TWISTER CYCLONE ON-ROAD CAR

Expect Twister's new Cyclone 1/10-scale racer to be one of the hot on-road cars of 1990.

The Cyclone should have been released by the time you read this, so there's a shortage of performance reports, but, driving one of the production prototypes, Gary Kyes took the A-Main at the Futaba Grand Prix.

Its features include a rear pod designed to keep the motor centered in the car for more consistent handling. The graphite chassis is designed to use saddle-pack batteries; the battery slots are cut close to the center of the car to allow it to recover quickly after a bump. The Cyclone has an Associated 10L front end, which has been very successful on the 10L and should be an asset for the Cyclone.



NEW FOR 1990



SCHUMACHER PRO CAT 4WD

The Pro Cat, which is the latest release from Schumacher, is a combination of the newest high-performance technology and the World Championship design of the Cat.

The Pro Cat has new rear-suspension geometry that makes use of a single A-arm with an adjustable top link, so caster is now adjustable. A beefed-up bottom suspension-mount system eliminates unwanted suspension flexing. A new shock- and wing-mount system also allows for a more progressive rear suspension, and the gear-

box has been simplified for easier maintenance. The Pro's gearbox is easier to set up, has less friction, and the newly designed diff shaft allows very quick spur-gear changes without the threat of the gear falling off.

Additional features include a saddle chassis, which allows the use of 6- or 7-cell battery packs and doesn't require tape, owing to the quick-change battery straps.

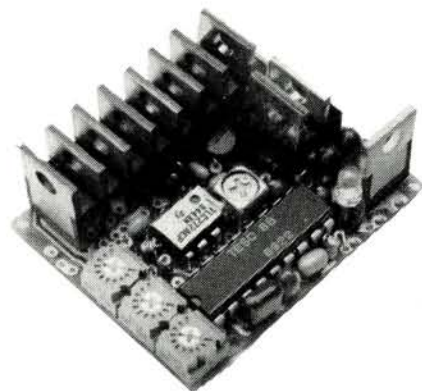


TEKIN ELECTRONICS ESC 700

With the introduction of the ESC 700, Tekin Electronics has added a new twist to the electronic speed-controller market.

This new electronic speed controller, which should be available now, uses 11 high-quality Tempfets for what should be a minimal amount of voltage drop. In addition, the 700 is capable of handling 4 to 14 cells (four more than the previous models), which will be ideal for drag racing, monster trucks, and racing. According to Tekin, improvements in manufacturing technology permit the lowest possible voltage loss through the speed controller. A high-frequency pulse rate is another feature that's unique to the ESC 700, and Tekin claims it will allow up to 30 seconds extra run time on a carpet-oval track.

A built-in torque limiter could give you the edge required in situations where only a certain amount of power is needed. Adjusting the torque limiter (effectively reducing the amount of current that will be supplied to the motor) could allow you to get through the trouble spots on the track. The photo shows only a pre-production sample; finished units will come protected in a molded housing, as usual.



TEKIN ELECTRONICS BC210 REFLEX CHARGER

Tekin has released its new Reflex Negative Pulse Charger. This entirely new concept in battery-charging is designed to restore power and run time to old, or improperly charged and discharged, batteries, making them almost as good as new. Unlike many other peak chargers, the Reflex Charger allows repeated charging of a pack without damage to the cells.

A dual-range switch is included on the BC210, and this makes this charger ideal for both SCR and SCE cells. In low range, the BC210 will charge from 1 to 4.5 amps for the SCEs, and in the high range, it will charge a 2- to 9-amp rate.

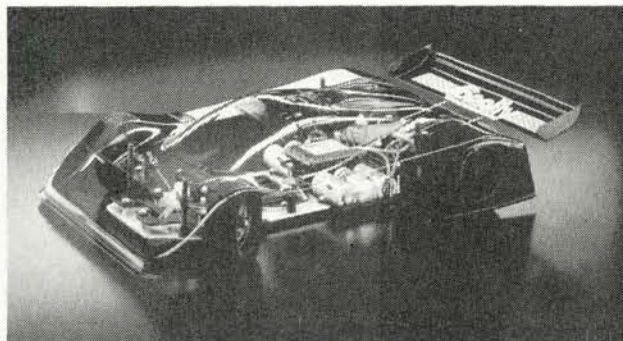
Although we've heard that reflex charging won't leave you with a better charge than the soft-pulse method does, the recuperative ability of reflex technology could make it worth looking into in the '90s.



ROYAL PRODUCTS HONDA 1/5-SCALE MOTORCYCLE

This new, ready-to-run, Honda Superbike is a 1/5-scale replica of Honda's well-known street/racing bike. The kit comes complete with a radio and electronic speed controller, and it's painted in the dramatic Honda red-white-and-blue racing scheme. Its features include: a removable anti-roll training extension with skid wheels; a geared RS380 Mabuchi motor; racing rubber slicks; servo-actuated shifting ballast; full, working, front and rear suspensions; and a maintenance-free drive belt. This large cycle is the first cycle to use the standard, 6-cell, 1200mAh batteries that are so popular for electric cars. With a plentiful supply of these batteries, this cycle could prove to be quite popular.





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TRAXXAS SLEDGEHAMMER TRUCK

The new Sledgehammer from Traxxas must be considered the first of the high-performance truck kits.

Monster trucks were previously available as kits, but there was more emphasis on scale appearance and scale performance than on racing. For those who wanted to race trucks, the only choice was to buy a competitive 2WD car and install a monster-truck conversion kit, but that was expensive.

The Traxxas Sledgehammer's design looks as though it's based on the company's popular Bullet off-roader, and it combines the handling ability of a car with the ruggedness of a truck.

All the performance goodies—4W independent suspension, oil-filled coil-over shocks, turnbuckle linkage, caster and camber adjustments—are included, as are parts that have been developed specifically for a truck application. (These include the planetary gear differential, an extra set of shocks, and the beefed-up components around the chassis.)

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C&M MFG. 1/8-SCALE COBRA

C&M Manufacturing pioneers 1/8-scale electric-powered cars with the introduction of its Cobra on-road kit.

Based on the design of the popular 1/10-scale Cobra on-road cars, the 1/8-scale car has been stretched and widened to fill the bottom of the 1/8-scale body.

The larger size of the car makes its movement more predictable than was ever possible with the 1/10- and 1/12-scale cars. As a bonus, whichever radio gear you have or buy will probably fit on the chassis, and you won't need microsensors or receivers.

Early versions were only available in fiberglass, but a new graphite version will be released soon, and according to C&M, this weighs as little as many of the 1/10-scale cars.

CORALLY SP10

Corally, which has been manufacturing a very successful 1/12-scale car, has just introduced the SP10, which is a 1/10-scale, on-road, racing machine.

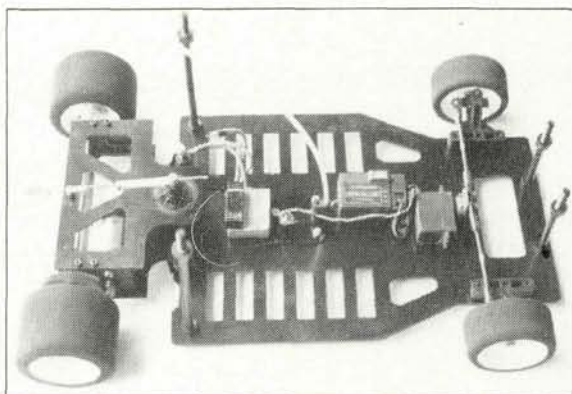
The SP10 has many of the features of the 1/12-scale car, including the unique "Coral" chassis. Coral is the company's own light, hardened, metal, and they claim it has the same flexing characteristics in all directions (unlike graphite, in which the top layers contribute more to the strength of the chassis than the layers in the middle do). The SP10 also has a Coral motor pod, motor plate, graphite T-bar, adjustable body posts and floating suspension that doesn't need tweaking. Included in the kit are 10 ball bearings, trued front and rear tires, three battery holders, adjustable body posts and an instruction manual (though the SP10 comes completely assembled).



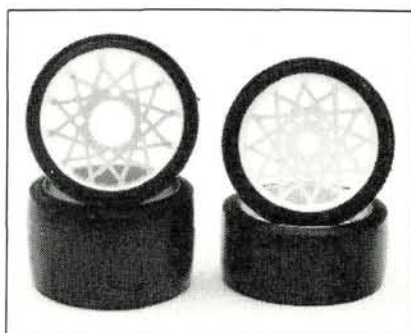
COX .049 GTP NISSAN

With the introduction of the 1/12-scale Cox .049 GTP Nissan, R/C enthusiasts can get a taste of what it's like to drive a gas-powered car without the expense of a 1/8-scaler. Making gas power more accessible is Cox's ratchet starter, which allows the engine to be pull-started instead of started with a separate remote starter. Compared with those of other gas-powered cars, its design seems to be far less complicated and confusing.

The size of the Cox car is also a consideration when you're looking for a place to run it. Although you want as much room as possible for wide-open running, the 1/12-scale size broadens your options. With its .049 GTP, Cox may have the key to ending battery wars in 1990.



NEW FOR 1990



TRC T/M RADIALS

The latest improvement in racing-tire technology comes from one of the leading manufacturers of tires—TRC.

Its new, rubber-cap tire—the TM Radial—is a dense foam rubber that has solid rubber molded to it. Initially, these tires were limited to the asphalt and concrete ovals, on which they considerably improved lap times and speed. TRC is also developing a line of rubber-capped tires for dirt-oval racing.

They have a rather healthy price tag, but these tires go faster and are designed to last up to five times longer than foam tires, so they're well worth the extra bucks.

PANDA CHERRY BOMB

The newest release in the Panda line of R/C vehicles is the Cherry Bomb Monster Truck.

In contrast to all the conversion trucks and super speed-racing trucks, the Cherry Bomb looks easy to maintain and operate, so it would be suitable for entry-level truckers, or for those who don't wish to compete or spend a fortune while doing a little car crushing. Some of its features are a three-speed controller with forward and reverse, control-link independent front suspension, a sealed differential/ball-joint-mounted transaxle, and a high-impact Lexan body.



KYOSHO BLIZZARD

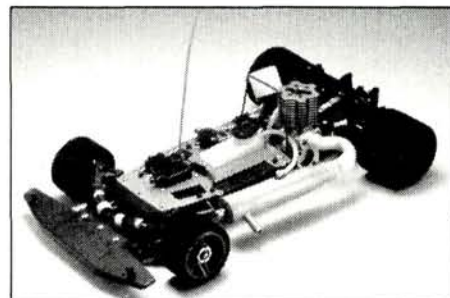
Kyosho has reintroduced the Blizzard—an all-terrain vehicle that can operate on sand, snow, ice and grass. It has an injection-molded monocoque main chassis with aluminum trailing-link independent suspension. The drive system comprises two efficient 380-size motors that are connected to a wide caterpillar-type track that allows the Blizzard to go virtually anywhere. A front power shovel and muffler are optional. Two gear ratios (low and high) are available for plowing with the optional power shovel, or cruising at high speed across the sand or the lawn.

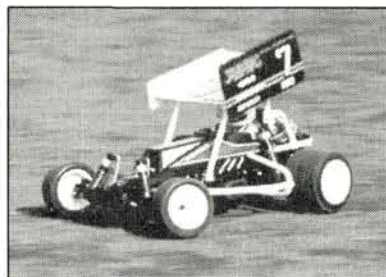


KYOSHO BMT

The Kyosho BMT won the 1989 IMFAR 1/8-scale World Championships! It needs no other introduction.

The BMT has a number of high-performance features that combine to make it one of the fastest 1/8-scale gas-powered cars in the world. These features include: 4W wishbone independent suspension with oil-filled coil-over shocks and stabilizers; mid-engine configuration with front and rear drive belts; and a clutch-type two-speed gearing system. Quick-change rear wheels, high-grip sponge tires, front and rear ball differentials, one-way bearings on the front wheels and a complete set of ball bearings further enhance its performance. Assembling the BMT isn't a trying experience, as it is with other 1/8-scale cars, because its instruction manual is excellent.





KYOSHO SIDEWAYS

To address the needs of sprint-car enthusiasts, Kyosho has introduced the Sideways—the first complete kit available for them.

Based on the Ultima, the Sideways comes as a complete kit, instead of as a conversion. The kit has an aluminum-frame chassis with 4W independent suspension. For dampening, four oil-filled, coil-over shocks are used. Its virtually maintenance-free planetary-gear differential doesn't need adjustment, but if you prefer a ball differential, it's available as an option. In fact, since the Sideways is based on the Ultima, almost all the Ultima's performance parts will fit it.

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KYOSHO TURBO BURNS

The new Turbo Burns from Kyosho has, as standard equipment, many of the parts that are available as options for the Burns. Some parts have been designed exclusively for the Turbo Burns, making this one of the world's fastest, best-handling, 1/8-scale off-road cars. It has a 3mm-thick aluminum long-wheelbase chassis; long-stroke double-wishbone suspension with four oil-filled, coil-over shocks; steel drive gear in an assembled gearbox; and ball bearings for all friction points. To make building easier, the front and rear differentials come pre-assembled.



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KYOSHO LAZER ZX

The latest in Kyosho's long line of successful 4WD cars is the new Lazer ZX.

As the Turbo Optima Mid SE's successor, the Lazer ZX combines many of the SE's features with some of the newest, go-fast goodies, and that should make this a very competitive 4WD car. The new features include: a graphite chassis and top plate; double-wishbone independent suspension with four oil-filled shocks; a dual-belt 4WD system with three differentials; 15 ball bearings; and many other components for racing.

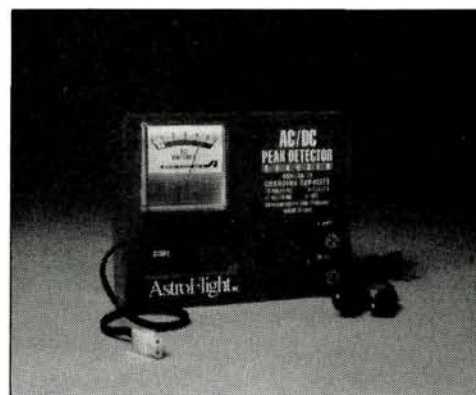
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TEAM ASTRO AC/DC PEAK CHARGER

Team Astro's new AC/DC charger is unique in that it combines the convenience of an AC charger with the performance of a DC peak charger.

According to its manufacturer, the Model 111 is capable of charging 4 to 12 cells with the cell's capacity in the 450mAh to 1700mAh range. This would cover just about every type of Ni-Cd used in R/C racing, including rechargeable transmitter batteries and receiver batteries—provided they're AA size and 450mAh or more.

If you're tired of carrying around a power supply, or running out to the car every five minutes to see if your battery has peaked on a DC charger, the Astro could be just what you want.



DIRT DIGEST

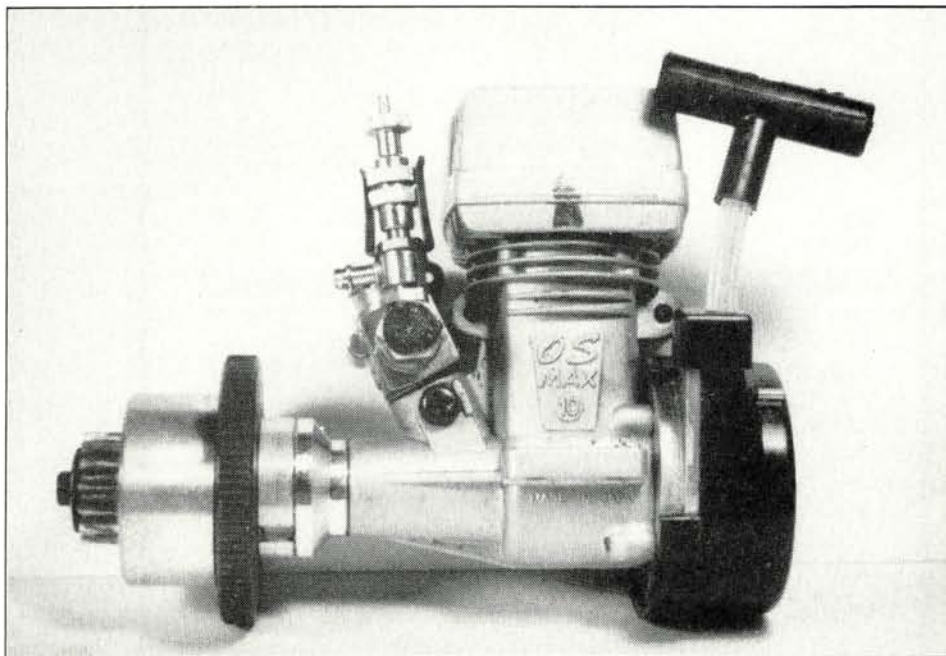
by BILL O'BRIEN & BOB KANE

The .10 FP-B: an *EXPLODED* view!

I Recently had the chance to review Kyosho's* Rampage, a 1/10-scale, gas 2WD buggy, for *R/C Car Action*. It set me on my ear! It wasn't so much that the car was a spectacular performer (it was), because I've come to expect that of Kyosho gas cars; rather, the outrageous .12 CZ-R engine that powered the buggy was equipped with a built-in pull-start.

The concept isn't new. The larger, gasoline-powered, weedeater engines are almost always equipped this way. Although our buggies' small glow engines often come with zip cords or loose lengths of rope, this new series of engines from Kyosho is the first of its kind to have an integral recoil pull-start. This means that you can throw away the 30-pound car battery you used for an electric starter, and you can toss out the electric starter, too! With this little recoil starter, all you need to take to the track is the car, a jug of fuel and some D cells to light the glow plug. (Kyosho includes the battery harness complete with alligator clips; you supply the batteries.) Your field box has been reduced to the size of an attaché case!

Even though 1/10-scale gas cars are initially more expensive than their electric

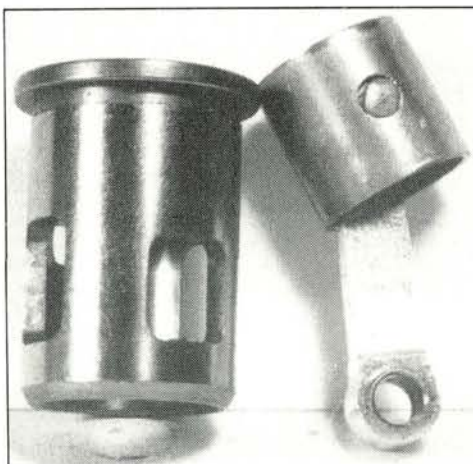


The .10 FP-B is a combination of .10-size glow engine and zip-cord starter that has been integrated into one package.

cousins, the reduction in the weight of starting gear should herald a giant interest in gas cars. You just have to clip, yank and go! It can't be any simpler, and you get run times of at least 15 minutes!

Gas engines do break down, however,

as I found out with my trusty RS-200. On the third weekend I ran it, the engine kept dying after hard acceleration. On the fourth weekend, it gave one tremendously fast pass, popped, and rolled to a screeching halt. There I was, during the first hour



The force that moves your car is ignited glow fuel pushing against the piston on the right. On the left is the sleeve used in the .10 FP-B to seal in compression. Imagine the beating your engine takes: Every time it turns, there has been an explosion in the chamber. In an engine that turns 23,000rpm, that's 383 explosions per second!



This rod has suffered one explosion too many. Stock connecting rods like this one are cast aluminum and are prone to damage on hard-working engines, as play develops in the lower rod end.



A look at this one-way bearing from the recoil starter tells the whole story. Notice the slot on the right, where it originally contacted the crankshaft pin. The wear shown here is from contact with the connecting rod end. Be sure to re-install it on the good side.

of our outing, sitting in the middle of a parking lot while Bob was running his Assault and Charlie Rodriguez (the third member of our group) was whizzing back and forth with a Rampage. My little O.S. .10 FP-B engine just wouldn't twist or turn.

They weren't about to pack up and go home, and I wasn't going to sit there for the next few hours doing nothing, so I decided to take the engine apart. My original inclination was that the engine had seized, so I poured 3-in-1 motor oil into the carb and the exhaust and let it soak until the engine cooled off.

The Frightening Truth

I anchored some paper towels on the asphalt and, with an immense show of bravado, removed the .10 FP-B from the RS-200. Now, I can talk about commutators and brushes all day long, but I'd never taken apart a gas engine in my life and, since the car is mostly factory-assembled, the RS-200 assembly manual came with the barest description of engine disassembly.

Of course, some things *have* to be there. A carburetor is mandatory, and it's easy

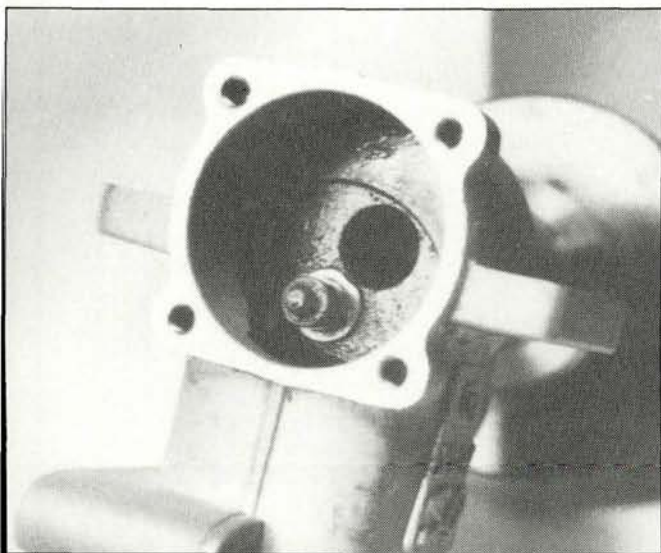
to recognize. On the FP-B, it's held in place with two screws, one on either side of the throat. Off it came, followed by the heat-sink head, which dissipates heat from the converted energy of the glow fuel. I removed four cap-head screws, and it was history. (There's no gasket between the head and the engine case.)

This exposes the top of the piston and the sleeve. In full-size cars, internal-combustion engines use piston rings to maintain the compression in each cylinder, but small glow engines, like the .10 FP-B, use a full-length metal cylinder (the sleeve) inside the case to do the same thing. One advantage is that if you score the polished surface of the sleeve, you only have to replace the sleeve, not the entire case. The sleeve's flanged lip also serves to seal the case and the head.

Next came the hard part: the recoil starter. It's pried off by lifting the edge of its plastic cover over three, small, extruded studs in the engine case. I didn't know that you don't have to undo the C-clip on the outside but, because I did remove the clip, the starter cover came off in my hand, leaving the rope pulley and shaft still in the engine. It might not seem

bad, but the steel spring band (about 10 feet of it) that provides the recoil action unraveled from inside the cover like a slinky toy, and it formed a clothesline from its attachment point on the pulley. I decided to worry about that later.

Extracting the pulley was no problem: It came off with the shaft intact, and this left the crankshaft cover it exposed. Usually, this cover is a solid end-cap but, to accommodate the recoil mechanism, it has a center hole for the pulley shaft to extend into the



The lower rod end slips onto this knob on the crankshaft. Nothing holds it in place, and there's some back-and-forth creeping as the engine works. The wear and tear caused by this movement is what eventually destroys the rod end.



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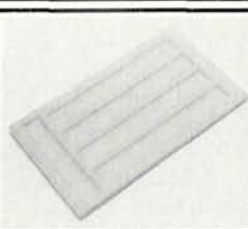
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DIRT DIGEST

engine case. Four small screws held it on, and they were soon removed. Be careful not to harm the thin gasket you'll find here.

Still inside the engine was the one-way bearing Kyosho uses to make sure the engine can't start on the recoil stroke. It's slotted on the inside face, where it catches a small pin on the crankshaft. By catching that pin in the slot, you manually turn the crank inside the engine when you yank on the pulley outside. The bearing came out in my hand, and I noticed that on one side of the inside face, the slot was scored and scuffed.

By removing the bearing, I exposed the rear of the crankshaft and the bottom of the piston connecting rod—or what was left of it. The engine hadn't seized: The connecting rod had exploded! I pulled the sleeve out of the top of the case (it's keyed so you can't put it back incorrectly), and the piston and the remains of the rod came out with it. There's nothing you're going to do about that in the field if you don't have another rod handy, and I didn't. The best I could do there was to clean out the rod fragments and flush the area with more oil.

Back to the Bronze Age

A quick stop at Bruckner Hobby on my way home got me a Richardson Precision Machining* (RPM) replacement rod. RPM makes a whole line of rods for a variety of engines. They're milled aluminum, not cast like the stock components, and RPM rods have a bronze bushing at the crankshaft side to handle the load better without stressing the end of the rod.

The replacement operation begins by removing the wrist pin from the piston. This holds the rod in the piston. Be careful of the incredibly small plastic caps on this pin. They keep the sleeve from being scratched if the pin walks a little from side to side.

Align the end of the new rod (large hole) with the holes in the piston, and reinsert the wrist pin. Slide the rod and piston into the top of the case, and finesse the rod end onto the crankshaft. Usually, you'd also want to remove the crank and the crankshaft bearing to inspect for rod pieces, but I didn't have a bearing puller and I didn't want to go through all the hassle. I may pay for it later, but I intend to replace the FP-B with a CZ-R engine, anyway.

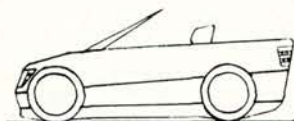
Slip the sleeve down into the case, but be careful. Make sure the notch in the

flange is already lined up with the tiny pin on the top of the case before you start to slip it down. Also, be certain that the piston is centered in the chamber so that the sleeve can slide down around it.

One more warning: If you get the sleeve about halfway down and feel resistance, stop immediately. Extract the sleeve and check to see if the wrist pin has slipped slightly out of the piston. If so, slip it back in with a small screwdriver, and hold the case vertically so that it doesn't slip again, then start the sleeve in again.

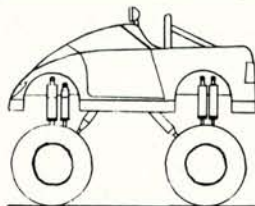
It's important that the notch in the flange and the stud on the case are pre-aligned, because the wrist pin can slip while you're installing the sleeve. If you haven't been careful about the alignment and the pin does shift, it can become trapped in one of the exhaust slots in the sleeve. At that point, you won't be able to extract the sleeve, and there won't be enough play in the piston to remove the rod to slide out the piston and sleeve together, so you'll be forced to remove the crankshaft to get things right. Pay attention to details early on, and you might have an empty trash can when you're done.

(Continued on page 196)



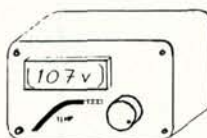
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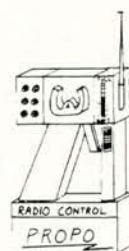
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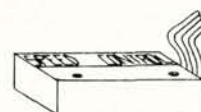
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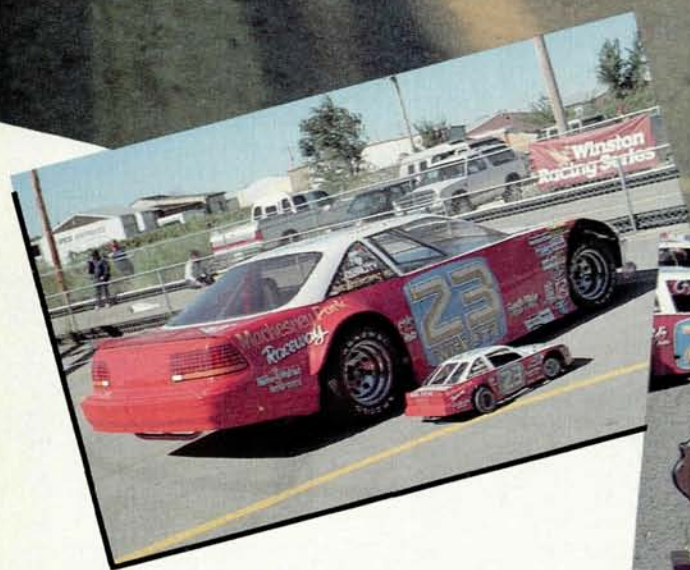
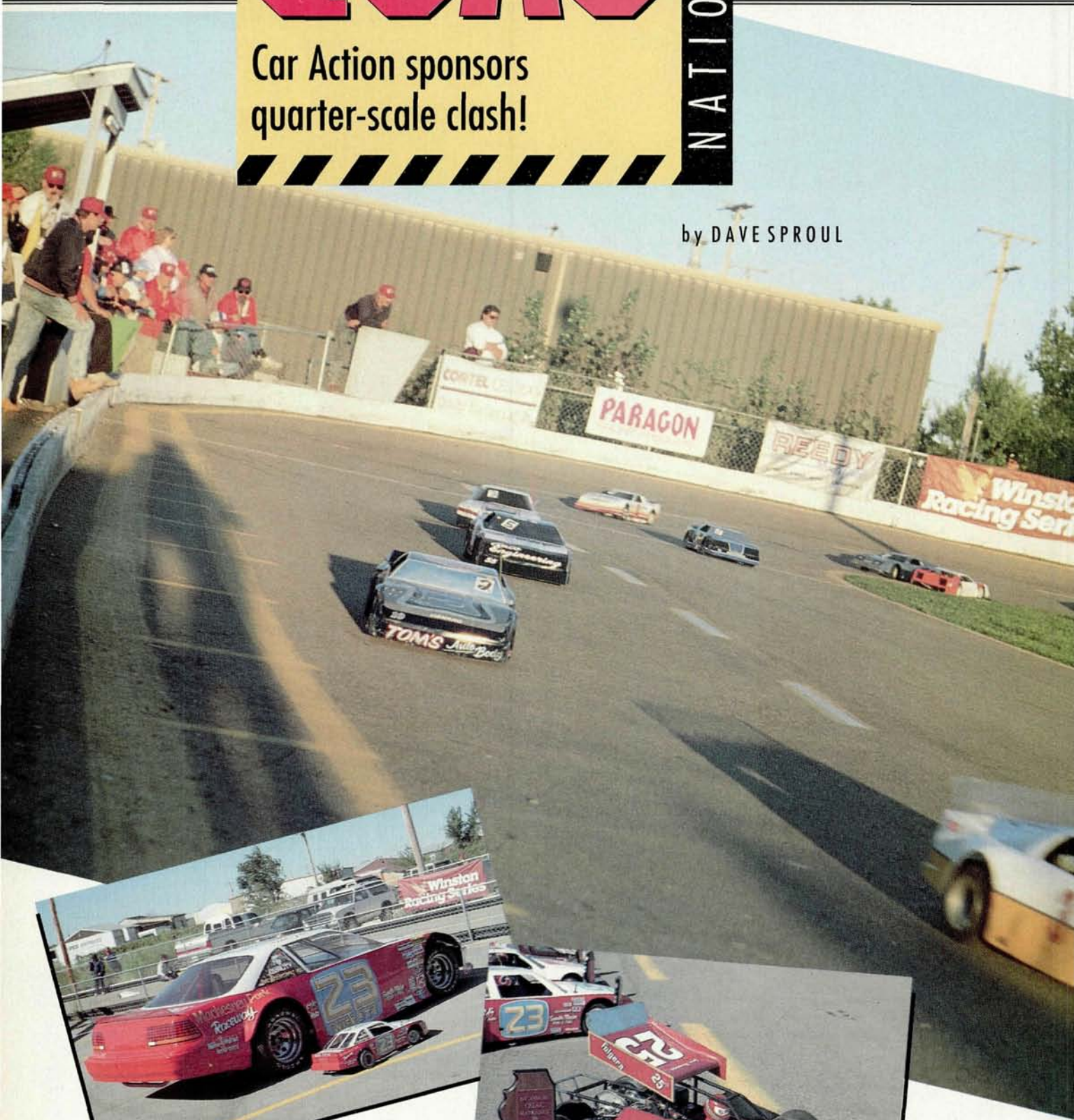
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NATIONALS

by DAVE SPROUL





MACHESNEY PARK Raceway in Machesney Park, IL, roared to life last fall, as the finest cars and drivers in the QSAC series prepared to duke it out for national titles. Held September 20 through the 23 and sponsored by Radio Control Car Action, the 1989 QSAC Nationals produced some of the best racing I've ever seen, with 97 cars competing for trophies and a piece of the \$5,000 cash purse.

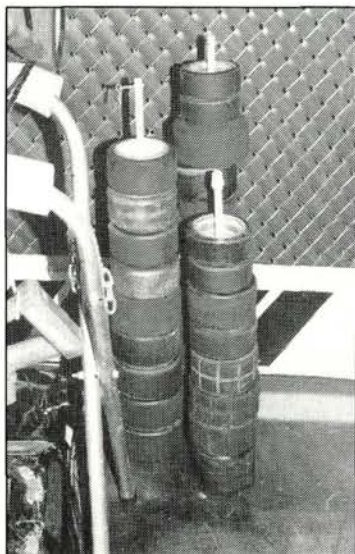
The raceway facilities were great, with indoor and outdoor paved $1/10$ -scale roadcourses, an outdoor banked paved oval and a $1/4$ -scale, $1/8$ -mile drag strip. There was also a hobby shop and a concession stand. On Saturday night, you could even hear the thundering of V-8 engines from nearby Rockford Speedway, and this added to the excitement. Racers came from as far away as California and Canada, so there was some good-natured ribbing about regional differences. Everyone was very cooperative, even if it meant lending a competitor a part so that he could stay in the race!

QSAC NATIONALS

Auto Engineering, WCM and RACO (all 1/4-scale manufacturers) were on hand to support the racers and, in some cases, their representatives raced, too. Jan Gilmer, of Gilmer Hobby and Machine, displayed and demonstrated his new direct-drive, 1/4-scale midgets. These beautiful machines can be push-started just like the real thing!

To set up the cars for the heat races and qualifying, practice racing started at noon on Wednesday and Thursday and lasted until 9 p.m. On Friday, Concours judging was held, and the heat races began. Although Saturday dawned bright and sunny, a cold front had moved in the night before, and this sent everybody in search of warm jackets—but what's a little cold to R/Cers? On to the racing!

Sprint-car racing started with the E-Main, as each driver vied for one of the top four positions and the opportunity to bump-up into the next Main. Local favorite Dave Solon, was a big success: He started in the E-Main and consistently worked his way up through the D, C, and B-Mains to a 3rd-place finish in the A-Main. Top-qualifier Jack Henricks of Machesney Park finished 2nd, and Vince Sansonne from St. Louis, MO, captured the QSAC National sprint-car crown.



This pit was ready for anything. You can never have too many tires at the racetrack.

2nd-place Chris Rahe of Raco with 30 laps, and Super Modified National Champ Vince Sansonne (who finished just ahead) also with 30 laps.

Even though ASA races held only A- and B-Mains, the racing was just as good. Auto Engineering's Lorenzo Benton of Jackson, MS, walked away with 1st place



Along with the sprint car shown here, Supermodifieds, Grand Nationals and ASA stockers competed at Machesney Park.

In the Super Modified action, top-qualifier Roger Newell from Winona, MN, was 5th in the B-Main and just short of a bump-up spot for the finals. A-Main racing was close, with 3rd-place Jason Brommerich of Winona, MN, at 28 laps,

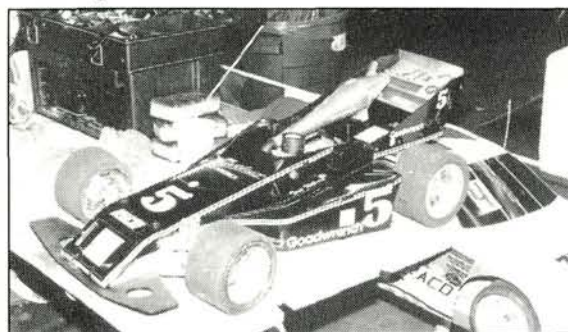
in the 30-lap B-Main. He then went on to out-drive everyone in the A-Main 50-lap feature, and this earned him the QSAC ASA crown. John Druskins from Wyandote, MI, was close behind and finished 2nd on the same lap, while 3rd-place-finisher Jay Bowman of Kalamazoo, MI, ended up three laps down.

The Grand National was the largest class, with 33 cars competing. It was also the class that traded the most paint and that tried off-roading in the infield most frequently, but, overall, the racing was excellent.

Lorenzo Benton's name came up again with 1st-place finishes in the E- through B-Mains. He led the 200-lap race for some time, until a traffic snarl put him into the grass and left him a few laps down where he finished 4th. Third went to Jon Rahe from Santa Ana, CA, and 2nd was captured by Walker Guthrie of Tyler, TX. Roger Newell of Winona, MN, took the QSAC Grand National Champ title. What a weekend of fantastic racing! The title of QSAC National Champion awaited the winner of each class. Hats off to each of them and to QSAC and Machesney Park Raceway for an excellent show!



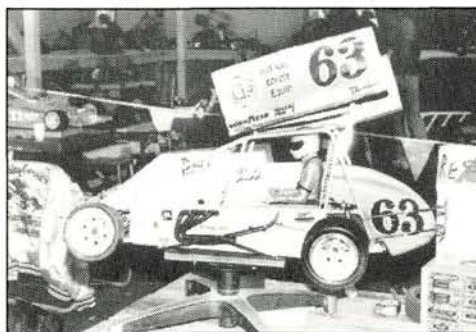
The Gilmer Midget is a running scale replica of the old-time midget racers.



Spotted in the pits is this new RACO Supermodified II, which features a new front end that's similar to the one found on its Grand National car.



These scales check overall weight, as well as the left-side weight, which is limited by QSAC rules.



This sprint-car driver can't wait to get out of the pits and back into the action!

TAP THE TORQUE

A S T R O DRAG SETUP

by BILL O'BRIEN

Carnage and Construction

I started with an old Fine Design* Fire-Fox II dragster chassis that I had already cut down for funny-car duty. As I suspected, the Top Fuel II motor (an Astro FAI motor with a milled shaft to fit stock pinion gears) wouldn't clear the engine pod. Out came the hacksaw, and although the result is too gruesome to show in a family magazine, by cutting away two-thirds of the left side of the pod, I managed to make the motor fit—barely.

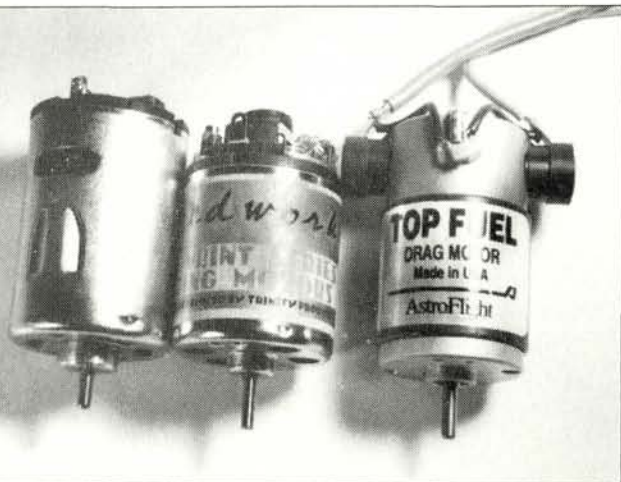
Unfortunately, my goal in life is to be as lazy as possible, and all that work was just too much to recommend to anyone. Then I remembered a new Fine Design Streamliner chassis that I'd received a few weeks before. As well as having an extremely light, foam-core, graphite chassis, it uses a different style of motor pod. On the Streamliner, both sides of the pod are cut out to allow the motor and drive gear to be mounted on either the left or the right side.

After sizing the motor against the pod, I knew it would fit if the rear of the Astro could protrude slightly through the left-side cutout. Unfortunately, there was absolutely no way to "shoehorn" it into the pod, so I undid the three cap-screws that hold on the left side, mounted the motor on the right side of the pod, and re-attached the left side. It was a fit made in heaven! Just for

DRAG RACING?—with a Team Astro* motor? Those of you in the know may start to laugh; after all, the Team Astro line has been around for years and is mostly known for its high-torque, almost unbreakable, electric airplane motors. Drag racing?...!

Then there's the problem of size. Most of the Japanese cars we run have an engine bay that's a perfect match for a motor using a Yokomo-size can, like those from Trinity, Rev-Tech, Twister, B&R, and the rest. An Astro motor is longer than a Yokomo can, and its brush mounts make it wider than even the 700-series motor Tamiya uses in the Bruiser. What could it possibly fit inside?—and drag racing?

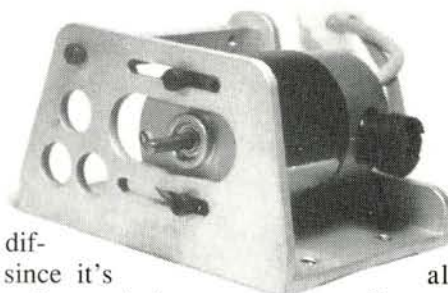
That's just about how I felt when his eminence, the editor of R/C Car Action, said "Do it!" I thought it would be easier to pass a camel through the eye of a needle, but you don't turn Hemstreet down.



Although the Top Fuel motor (right) has a thinner barrel, it's much longer than the Yokomo (center) and slightly longer than the Mabuchi (left). The huge brush mounts make it difficult to install the Top Fuel motor in many cars.

ASTRO DRAG SETUP

After all the chaos and confusion, Fine Design announced a new pod that's designed specifically for the Team Astro motor.



safety's sake, I taped over the motor wires where they were pressed against the aluminum walls of the pod, but the whole thing went together like Cinderella's foot and the glass slipper.

After all that hassle and expended energy, I discovered that Fine Design had introduced a motor pod specifically for the Team Astro motors. Wouldn't you know it?; had I put the project off a little longer, I wouldn't have had to do so much work!

I finished off the Streamliner chassis with a Bolink* body, one of Bud's bi-level wings and 2 1/2-inch rear tires on Fine Design aluminum rims. To these, I added a Futaba* receiver and a 132H servo for steering chores, and I topped-off the electrics with a PDI* drag speed controller. For power, 10 two-thirds, sub-C cells went in, and I prepared another 10-cell pack for spares.

Gearing presented a problem. I typically start a drag motor off at 6:1 and work around from there, going either upward or downward, depending on the

desired result.

The Team Astro demands a slightly different perspective since it's also a high-torque motor. I geared the Streamliner 81/21, spur to pinion (48 pitch), and this is about 3.86:1. On the way to the track, I picked up 23- and 26-tooth pinions because that starting ratio was a little higher than the 3.4:1 that would have been optimal.

Run-Down

Like many of the grassroots dragsters out there, we run on a freshly tarred stretch of parking lot measured out for the 132-foot distance that represents a 1/10-scale quarter-mile. We don't use a sophisticated timing setup for the tests, either (although the \$2,000 price tag on the timing lights might make them a great buy for a club that wants to keep track of reaction times and trap speed, and do bracket racing).

Instead of timing lights, we use two Heuer digital stop-watches. We start them simultaneously (well, almost!), noting any differences between the two that would have to be subtracted later. I hold one at the starting line, and someone else goes to the finish line with the other. When I launch the dragster, I stop the first watch, and when it reaches the finish, we stop the other. Elapsed time is the difference between the two times minus any difference we noted when the two watches were started. The

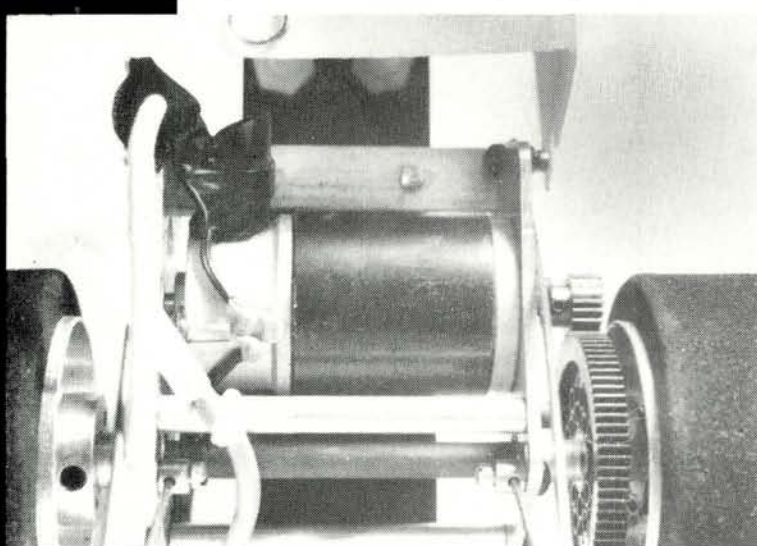
Team Astro Top Fuel II motor surprised me. Even with the high gearing, the dragster launched well, and it took off down the track. We calculated the E.T. at 2.97 seconds, and that's about .8 second off competitive times. Instead of carrying the car back to the starting line, I ran it back and launched it again for a 3.01, and then again for a 3.08. The slower times were caused by the big 10-cell pack draining down.

When I put in the fresh battery pack and went to change pinion gears, I discovered that my hobby shop had slipped me 64-pitch gears instead of the 48s I had asked for. Oh, well! We ran the car the way it was and recorded times of 2.68, 2.74 and 2.86, abusing the cells as we had during the first three trials, but achieving much better times nonetheless. (Yes, the condition of a battery pack will also affect the way your dragster runs, but that's another story entirely.)

Conclusions

I hate being honest when it makes me look foolish, but the the Team Astro Top Fuel II motor really surprised me. I took a competitive chassis and competitive elec-

(Continued on page 198)

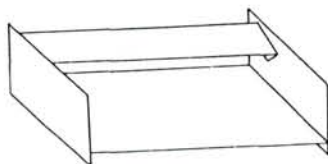


The left side of the Fine Design Streamliner motor pod had to be removed to install the motor.

"GO WITH THE FLOW"

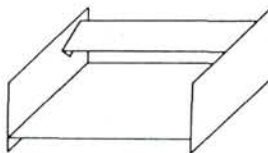
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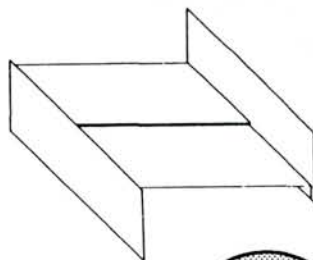


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WCM SUPERMODIFIED

(Continued from page 24)

is strapped to the inside of the left pod, and a standard S-148 servo handles the throttle and the brake. Install the front and rear bumpers and assemble the wing. The wings are held to the car with Velcro, so they come off in a crash without being destroyed. I used four 3-inch-wide Dia-

mond Back* tires that are mounted on two-piece rims.

PERFORMANCE: I took the car to my private testing grounds—the large parking lot behind my house. After filling the tank with a 50:1 gas and oil mixture, pressing the primer bulb several times, and following the directions in the manual, the car started easily.

Although I was eager to get the car out

onto the track, I let good judgment prevail. To check out my radio range and to be sure that everything was in order, I put the rear of the car on a block and walked about 150 to 200 feet away from it. With all systems go, I removed the block and took some warm-up laps around the tri-oval course that I had set up. Before I could stand on the gas, I ran the car for 10

(Continued on page 122)

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WCM SUPERMODIFIED

(Continued from page 120)

laps to wear-in the new tires, and this prevented the car from going into a spin. With a few adjustments to the suspension and a little more wing angle, the car was soon turning some quick laps.

After several close calls with the inside

turn-cone marker, I hit it just right, and the car made a wild flip into the air, and this sent the wings in a variety of directions. After all, durability has to be checked—right? The car finally came to rest on all four wheels. After a quick once-over, I re-attached the wings and was back on track.

Because the WCM Supermodified

comes largely assembled, it was simple to build, but don't attempt to operate it without using thread-locking compound on every nut and bolt. Quarter-scale cars are very realistic to drive, and they have very realistic crashes. (Fortunately, this doesn't happen very often.) Maintenance is simple, and performance and reliability

(Continued on page 124)

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(Continued from page 122)

are excellent. I give the Supermodified a thumbs-up; it was a pleasure to drive.

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BUILDING IT RIGHT

(Continued from page 30)

Looking from above, the arms of the steering blocks should be parallel to the ground and pointing toward the back of the car. The second set is used as the rear hub carriers. This time, the one with the "L" is used on the right, and the one with the "R" is used on the left; the arms

(Continued on page 134)

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I N T E R - F A B

VIPER PRO-10

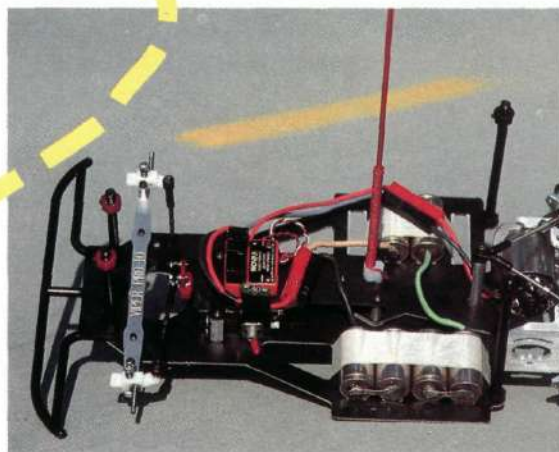


ON-ROAD REPTILE

by LOU ANDREKO

THE NEW KID on the block just occasionally proves itself to be better than the local gang, and the new Viper Pro-10 has entered the scene looking really defiant. Progress and highly motivated high-tech manufacturers have combined in an attempt to bring serious R/C racers a competitive edge, whether they race on carpet or pavement. So how is this "new kid"?

THE KIT: From Inter-Fab Custom Machining*, the Viper Pro-10 is an assembled, 1/10-scale, on-road racer with a straightforward rolling graphite chassis, so it doesn't take long to get onto the track. It has a chassis stiffener and



INTER-FAB CUSTOM MACHINING

VIPER PRO-10

Type On-road
Scale 1/10
Sug. Retail Price \$260

DIMENSIONS:

Overall Length 13.5 inches
Width 7 inches
Height 2.5 inches
Wheelbase 10.5 inches
Front Track 7.5 inches
Rear Track 6 inches

WEIGHT:

Gross (w/bat.) 43 ounces

BODY:

Type '89 IROC Camaro*
Material Polycarbonate

CHASSIS:

Type Pan w/stiffener
Material Graphite

DRIVE TRAIN:

Primary Pinion/spur
Transmission Direct-drive
Differential Ball-type
Bearings Ball bearings (rear only)

SUSPENSION:

Front: Type Coil springs
Dampening None
Rear: Type T-bar
Dampening Two rods w/coil springs

WHEELS:

Front: Type BBS-style nylon*
Dimensions (DxW) 2x1.25 inches
Rear: Type BBS-style nylon*
Dimensions (DxW) 2x2 inches

TIRES:

Front/Rear Twinn-K black-dot foam*

ELECTRICS:

Motor 05/540*
Battery 6- or 7-cell saddle pack*
Speed Controller Electronic*

OPTIONS AS TESTED:

Futaba Magnum Jr. radio; Novak NESK T-4 speed controller; AJ's Twinn-K black-dot tires; Trinity stock motor; JG Mfg. '89 IROC Camaro body.

COMMENTS:

The Viper Pro-10 is a good-looking, well-machined chassis. I was able to achieve competitive handling after working on the T-bar and adding low-profile tires to lower the ride height. The price is a consideration in view of the necessary items that aren't included with the kit.

*not included

two servo-mounting blocks, which will only accept the small hi-speed output servos.

The machined-aluminum front axle is completely assembled and has a coil-spring mounted above the steering blocks on the right and left kingpins (no caster adjustment). You'll have to supply your own steering linkages, servo-saver turnbuckles, and heavy-duty rod ends. The front of the chassis pan has holes so that you can change the wheelbase to make a difference of about 1 inch. The R/C gear is easily mounted to the chassis with servo tape. The chassis stiffener provides an extra platform, so you can mount your ESC on it for better airflow across the heat sink.

The rear pod is a very fine machined-aluminum assembly that's mounted to a flex-plate T-bar off the main pan. The rear suspension is a simple setup consisting of two 4-40 rods attached to a center post on the main pan. (The post comes up through a hole in the T-bar.) The other ends of the rods are attached to the rear pod and have small coil springs to achieve some dampening. This rod/spring setup also enables you to adjust chassis tweak.

The Viper's steel rear axle has an adjustable ball differential and precision ball bearings. (A titanium rear axle is also available.) The motor can be mounted on either side of the rear pod, and the wheel hubs will accept a wide range of lightweight wheels and your choice of tires.

Missing from the rear pod was any means to adjust the Viper's ride, so I can't change the height of the car to suit the ground. Without this, it's difficult to compensate for a bumpy track or decreasing tire diameter. The Viper also lacks wing-mounting posts, and wings

are necessities on high-speed tracks.

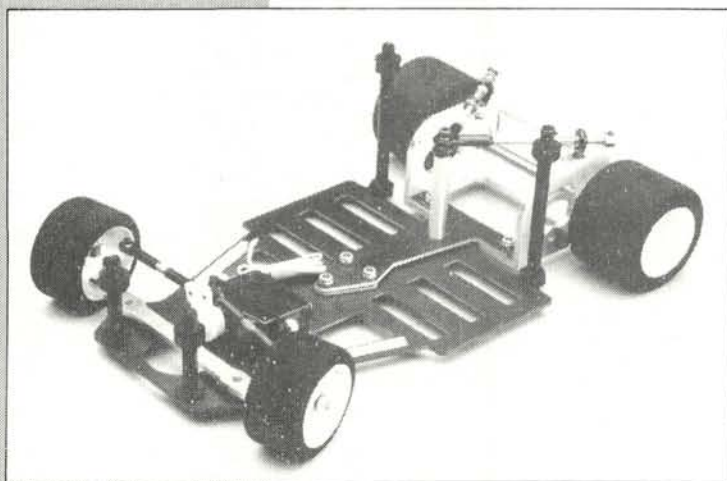
The chassis has four battery slots on each side, and these make saddle packs mandatory. Because I planned to run the car on an oval, I configured my Sanyo* SCR 6-cell pack with four cells on the left (inside) side of the chassis and the remaining two cells on the right. This arrangement puts most of the battery weight on the left side of the car and allows it to take tight turns better. Experiment with battery position to find where the weight should be for the type of track on which you race.

For this track report, I used a pre-painted 1989 IROC Camaro body from JG Manufacturing*. The Viper comes with four 1/4-inch nylon bolts, and these are used as body-mounting posts, but it doesn't come with the 1/4-inch nylon nuts that support the body. To give the Viper that total racing look, I added NASCAR decals and large numbers. I had to add an antenna, too, and I opted for an anti-roll fiberglass antenna to finish off the Viper's rolling chassis.

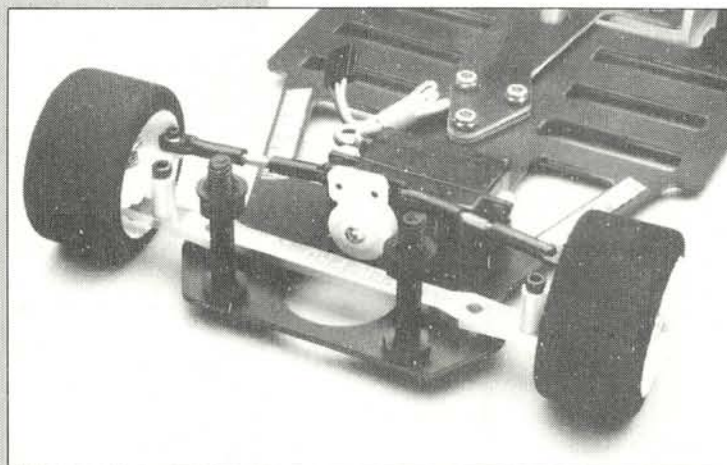
Equipped with a Trinity* stock motor, a Novak* T4 speed controller and a Futaba* Magnum Jr. radio with S132H servo, I thought my Viper Pro-10 was ready to challenge the gang at my local track.

PERFORMANCE: With everything in place, it was time to pack up the toolbox and head for the track. My local track, Sugar Hollow Speedway, in Danbury, CT, is a 320-foot, concrete tri-oval, and it's very fast.

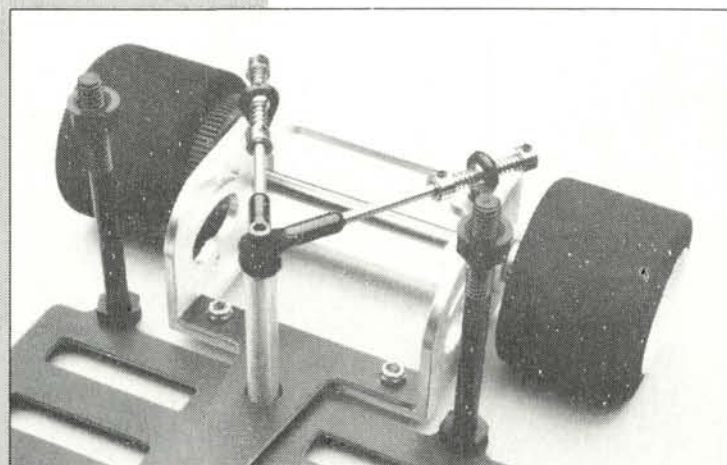
With the chassis tweak set and traction compound added to the tires, I had to come up with a way to get some downforce on the rear end. At high speed, you'll lose it in the corners if you don't use a wing or a spoiler. Since the



The rolling chassis of the Viper Pro-10 features a T-bar in the rear and battery slots for saddle packs.



A non-adjustable crossbar makes up the front end of the Viper.



Two rod links with springs control rear tweak. Note the lack of wing mounts.

VIPER PRO-10

Viper's rear pod has no wing mounts, I cut out a large polycarbonate spoiler and taped it to the rear of the body with servo tape.

I'm very familiar with the track, and I set up the Viper Pro-10 in the same way as I set up my other on-road car. On my first run, I found that, to take the corners, I had to slow down too much, so I had to go back to the workbench. I made a variety of dampener adjustments, but none seemed to correct the problem.

By taking a closer look at the Viper's T-bar, I found that it was of the same thickness as the chassis, whereas most T-bars are made of a thinner plate stock that allows more rear-pod flexing. To correct this problem, I took out the T-bar and narrowed it by grinding out a $\frac{3}{8} \times 1\frac{1}{4}$ -inch section. This modification allows it to twist more.

To bring the rear end closer to the ground, I put some old, AJ Twinn-K low-profile black-dot tires on the rear wheels, and then I headed back to the track. This time, the Viper Pro-10 handled well, and I was able to maintain a lot more speed through the corners.

Although the Viper gets you to the track quickly, it unfortunately lacks some of the things included on other cars costing the same or less. It doesn't come with front ball bearings, wheels and tires; a means of ride-height adjustment; steering linkages; or nuts for the bolt-style body posts. The Viper Pro-10's T-bar needed work to make it handle well (especially in the corners), but by adding the necessary components and doing a little suspension work, anyone can have a competitive Viper, and my local gang has let this new kid join in the fun!

**Here are the addresses of the companies mentioned in this article:*

Inter-Fab Custom Machining, 12 Springdale Rd., Cherry Hill, NJ 08003.

Sanyo Electric, Battery Division, 200 Riser Rd., Little Ferry, NJ 07643.

JG Manufacturing, P.O. Box 6014, Whittier, CA 90609.

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Futaba Corp. of America, 4 Studebaker, Irvine, CA 92718. ■

ROOTS of R/C

P A R T I

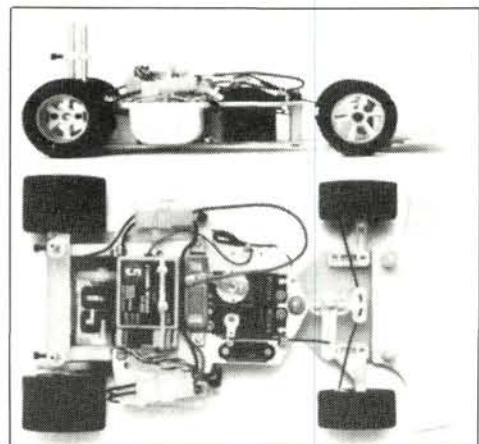
WELECTRIC R/C CARS are toys!" During the mid-'70s, this was the overwhelming opinion of R/C racers who were immersed in 1/8-scale gas-powered racing. Although this statement had a certain amount of validity at the time, most R/C enthusiasts today know better than to call electric-powered cars "toys."

When electric cars were in the early stages of development, gas racing was in full swing. With their nitro-burning engines and their intricate suspensions, gas-powered cars were far superior to the simple electric cars. Although electric racing was well-known to those who were already involved in some type of car racing, it was virtually unknown to the public. Electric racing didn't get its start until the late '70s, when a number of 1/12-scale kits became available from companies such as JoMac, Leisure, Associated, Bolink, MRP and others.

Early electric-powered cars, many built from scratch, were run on lead acid batteries, (similar to flashlight batteries), then later moved on to the Ni-Cd cells. As in the beginning of 1/8 scale, electric-powered cars had virtually no suspension; they relied on the chassis to soak up the bumps. One of the popular chassis designs was referred to as the "dogbone," because of the shape of the chassis plate: The chassis was wider in the front and the rear (to provide a mounting for the axle and the motor pods), but the center of the chassis was narrow. This allowed the front-to-rear and side-to-side flex that's accomplished through today's T-plate and front kingpin design, although much less effectively



Driving for MRP in his early teens, Joel Johnson is shown here in the pits during the '81 ROAR/Sanyo Nationals.



One of the dominant on-road designs for 1/12-scale road racing was the Associated RC12E. Note the large radio plate and the size of the radio gear!

and without the benefit of dampening.

The early versions of these cars also had no differential; most racers today wouldn't drive without one! The standard was a solid axle with a spur gear bolted on. It wasn't until later that the ball differential that's used today on most competition-level cars was developed. There weren't any electronic speed controllers during this time either, so racers had to make do with the wound-resistor or stepped-mechanical speed controllers that are still found on many new kits.

These cars were powered by a motor that's still used in many entry level-kits: the Mabuchi 540. Referred to as the 05-class motor, it has a closed end-bell design, with cooling slots on either side of the can near the commutator. Before the days of open end-bell motors, a popular break-in technique was to dip the motor in water or, sometimes, in lighter fluid! The latter isn't a practice I recommend!

The benefits of electric motors are many: Unlike gas engines, they don't require constant attention to run well. In fact, apart from being kept clean, electric motors don't need any adjustments to turn in consistent performances. By putting resistance across the field of a motor, racers also found that it would act as a brake, and this eliminated the need for a mechanical braking mechanism. In short, compared with 1/8-scale cars, electric cars have a simpler assembly and are much cheaper to race.

Although 1/12-scale racing continued to grow at an ever-increasing rate, its expansion was limited by the need for surfaces on which to run. Just about any good-size plot of asphalt would do,

by STEVE POND

Below: The Elecrider was one of Kyosho entries in the early days of electric-powered radio-control.



Right: The original Associated RC10 was the design that brought R/C car racing into the high-performance era.

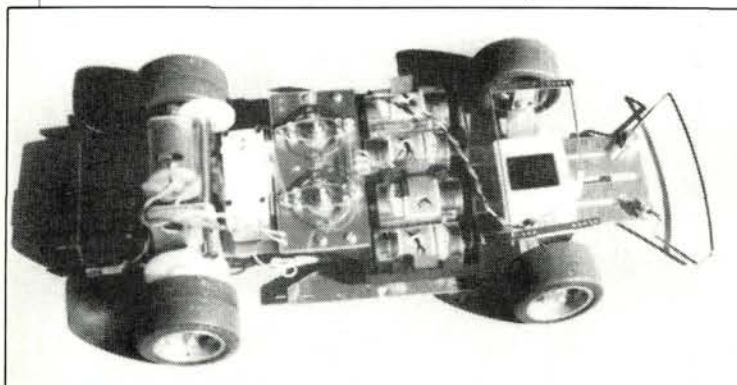


but the surface had to be very flat and clean for the cars to handle well. Aside from parking lots, the only other alternatives were $1/8$ -scale tracks, which were very large and sprayed with oil from 2-stroke engines, or indoor carpet tracks, which weren't in overwhelming supply.

Then, in the late '70s, an entirely new type of R/C car was introduced, and it made R/C car racing increasingly popular right up to today. Tamiya came up with a revolutionary design



Remember the Holiday buggy tires that were once so popular on the RC10? This is where they came from—the Tamiya Holiday Buggy, which was introduced in late '78!



Some of the early electric-powered $1/12$ -scale cars actually used alkaline batteries. You can imagine how expensive that would get!

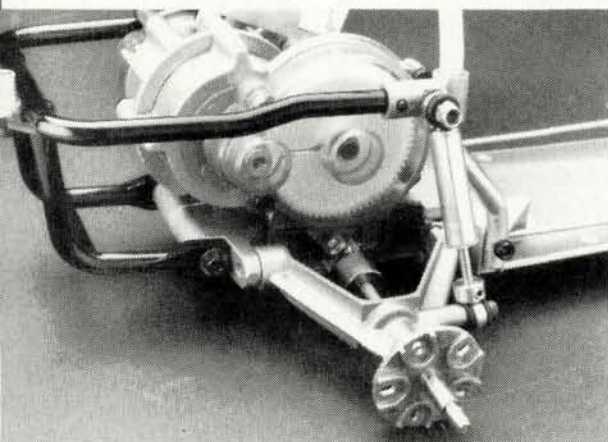
that knocked the R/C car industry for six: the $1/10$ -scale Sand Scorchers.

This car has been hailed as the first true off-roader and takes the big bow for starting the off-road craze. Although others had made attempts at an off-road car, each was nothing more than a $1/12$ -scale car with a different body and larger tires to clear the rocks. It was difficult to run these cars off-road: Owing to their lack of suspension, they simply went belly up at the first sign of a bump.

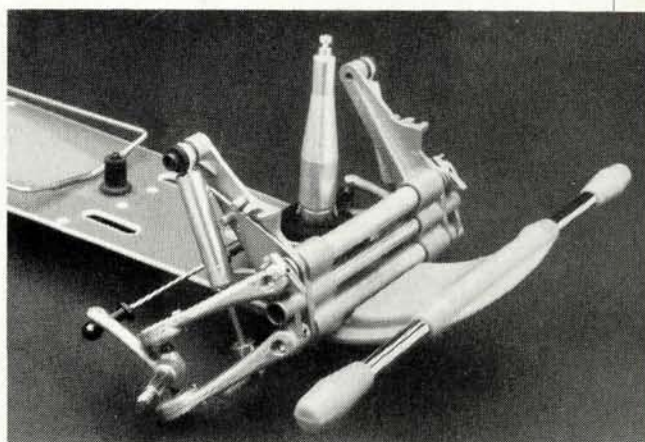
The Sand Scorchers, however, had a radical new design: Its four-wheel independent suspension was dampened by oil-filled shocks. The front suspension was a trailing-arm type, with upper and lower arms that were connected to a steering block. The rear suspension was a single A-arm, which allowed for radical camber changes when the suspension compressed, but it was still more effective than anything else available. Many of the parts were cast from an aluminum alloy that allowed it to take tremendous abuse, and all the electronics were encapsulated in a waterproof shell that protected them from water and dirt.

Although the Sand Scorchers could by no means be compared with today's high-tech R/C vehicles, this car blew its off-road predecessors right off the map. It allowed racers to take their efforts off-road, and it was ideal for those who were interested in R/C cars but didn't want to race. Unlike $1/12$ -scale cars, the Sand Scorchers (and the many off-road kits that followed) could be run anywhere from a back yard or a playground to one of the full-blown, off-road race tracks that were popping up across the country. Tamiya continued to develop the Sand Scorchers design and came up with the Rough Rider, which had a chassis very similar to the Sand Scorchers', but used the single-seater, off-road body that was found on many full-scale Baja cars.

Cox Hobbies (one of the leading manufacturers of low-cost R/C airplanes) developed its own off-road car, the Scorpion, which was released in '82. The Cox Scorpion's design was similar to that of Tamiya cars, but it was slanted more toward performance. Still using a trailing-arm suspension, the Scorpion did away with the overprotective radio box, and it used a number of other lightweight components that considerably enhanced performance. The radio gear was sufficiently rugged to get a little dirty and, if you avoided large puddles, it had no problems. This new, lightweight car



Left: The Sand Scorcher rear suspension was as tough as they come, but it allowed for radical camber changes.



Right: The solid-aluminum front end of the Sand Scorcher was the trailing-arm type, dampened by oil-filled shocks.

offered longer run times, faster speeds and superior handling, and that's what racers and non-racers live for!

To keep up with the Joneses, Tamiya also made a more performance-oriented car—the Super Champ—which also shed some weight for fast running. Still based on the Sand Scorcher, the Super Champ used rugged, aluminum suspension and chassis components, but the radio box was eliminated in favor of a radio tray (like the ones that were popular on 1/12-scale cars). The radio tray was simply an upper fiberglass plate; it not only held the radio gear in place, but it also stiffened the chassis and allowed quicker battery changes (these were very difficult with earlier cars). It was determined that it was better to change the battery and let it cool before charging than to charge a hot battery pack.

Though the Tamiya and Cox cars were very successful for some time, enthusiasts were still aching for blazing off-road speed. An answer to their needs was on the drawing board, and it would make most of off-road cars obsolete in performance circles.

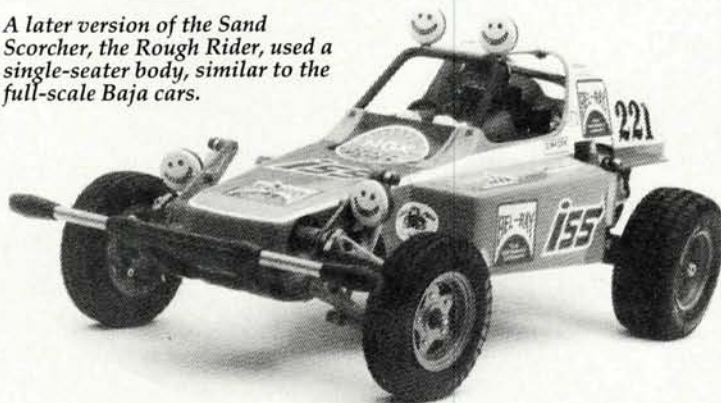
Team Associated, which had dominated 1/12-scale racing with its RC12E (and, later, the RC12i), began working on its own breed of off-road car. As we might have expected from its track record in other types of racing, it wasn't long before this company had a piece of the off-road pie.

In 1984, Associated introduced the RC10, which was truly a racing machine. Based on a strong, but lightweight, alumi-

The very first true off-roader, the Tamiya Sand Scorcher, combined scale with performance.



A later version of the Sand Scorcher, the Rough Rider, used a single-seater body, similar to the full-scale Baja cars.



num tub-chassis design, the RC10 had features never seen before on R/C off-road cars. The suspension components were molded from glass-filled nylon—a very strong, lightweight,

flexible material. This type of nylon was every bit as strong as the aluminum suspension components, but it flexed slightly when hit, so there was less breaking and bending than with aluminum parts.

To soak up the bumps, the RC10 used a set of four oil-filled, coil-over shocks that operated very consistently and were easy to change. The car's transmission was also a breakthrough: It was the first to use the ball-type differential that was popular in 1/12-scale cars. With the ball differential, racers could limit the amount of power going to the rear wheels; this made it much easier to keep the car going in a straight line under acceleration.

The most direct benefit of the ball differential was

that it allowed the car to get around tight turns with both rear wheels firmly planted on the ground. The slotted motor mount enabled drivers to change the pinion gear quickly, and this made it very easy to get the best possible performance out of the car within the 4-minute time limit prescribed by the racing organizations. At the first IFMAR Off-Road World Championships, the RC10 walked away with top honors at the hands of the talented Jay Halsey. Only after the RC10 had a clean run at the entire R/C racing circuit were other cars introduced to challenge it.

Kyosho introduced its own off-roader—the Ultima—in late

(Continued on page 198)

Bru-Line Super System

A full range of coordinated Monster Truck Wheels



Truck shown above with dual adapters and wheel covers. This modification can be used on many other cars and trucks.

Bru-Line "Super System"

wheels allow most 1/10 and 1/12 scale cars and trucks the use of smaller truck tires all the way to the ultimate Clod Bluster tires.



Kyosho Double Dare with "Super System" wheels and Clod Buster tires. Just one of the many cars and trucks that can use this conversion.

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BUILDING IT RIGHT

(Continued from page 124)

should be pointing upward, perpendicular to the ground. It's helpful that these pieces do two jobs, because you don't have to carry as many spares.

The universal shafts included in the kit seem nicely machined, but one of them


wouldn't fit through the ball bearings and the wheel hub. No problem: I used my trusty Dremel tool with a grinding drum to take off some of the steel axle. With just a little work, the axle was ready to go.

The wheel hubs have two sizes: an 8mm offset for the front and a 6mm offset for the rear, so don't get these con-


fused. To hold the wheel hubs to the spots on the axles, use a small amount of thread-locking compound on the threads of each setscrew.

The kingpins that hold the front steering blocks in the front hub carrier must be handled with care. After applying a small amount of lube on the non-threaded

(Continued on page 136)



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BUILDING IT RIGHT

(Continued from page 134)

part, thread the kingpins through the hub carrier and into the steering blocks. Make sure the steering blocks pivot freely; if they don't, you've over-tightened them and caused them to bind. You can eliminate binding by loosening the kingpins a little.

Continue by assembling the suspension arms. Don't worry if the pins don't move freely in the arms; they aren't meant to. The pins should pivot in the holes of the bulkheads. Assemble the upper control links as the instructions tell you. It would have been convenient if a full-size illustration had been included to measure the links.

Put the suspension arms through the pivot holes in the bulkheads and secure them with E-clips. The pins fit the rear bulkhead well with just a hint of slop—just enough to allow the arms to move freely. The holes of the RPM front bulkhead weren't large enough to allow the front arms to pivot, so I used a 7/64 drill bit to open up them a little; the arms then pivoted perfectly. Connecting the upper control links to the shock towers finishes this part of the assembly process for now.

You should be aware of some things to look for when building your car. Many parts on R/C cars are made in molds. Depending on the age and quality of the molds, the parts could have bits of nylon or plastic around them; this is called "flashing." Parts made this way usually come on a parts tree or, at least, are joined with similar parts. When they're cut apart, tabs of nylon or plastic will remain. Make sure that all flashing and tabs are trimmed off with a scissors or a hobby knife, as excess plastic or nylon could interfere with the movements of critical suspension parts. Although the parts on the YZ-10 were molded, they came already trimmed and separated.

It's also very important that you check for proper alignment of bearings in bulkheads, hub carriers, etc. Misalignment will definitely adversely affect performance, and it might cause damage to speed controllers and motors.

That's all for now. Next time, the saga continues!

*Here are the addresses of the companies mentioned in this article:

Yokomo; distributed by Associated Electrics, 3585 Cadillac Ave., Costa Mesa, CA 92626.

Dremel; division of Emerson Elec., 4915 21st St., Racine, WI 53406.

RPM (Richardson Precision Machining), 5070 Golden Dr., San Jose, CA 95129.

Dan's RC Stuff, 9525B Cozycroft Ave., Chatsworth, CA 91311.

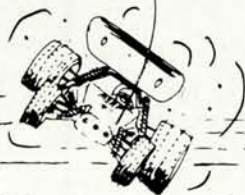
Jammin' Jay's Products; distributed by RPS/Team Losi, 1655 E. Mission Blvd., Pomona, CA 91766. ■

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SHADOW



Pit stops with a stock setup

by FRED MURPHY

OVER THE PAST FEW YEARS, Lazer Lite Racing Systems Inc.* has made a great contribution to the R/C industry with its Shadow 2+2 racing cars. These cars were designed for speedway-type racing, but as time and testing continued, it was found that they performed as well on on-road courses as they did in speedway racing.

Let's go one step beyond the traditional 4-minute on-road races with which we're all familiar. We've all heard and read about the great races held at places like Whippoorwill Speedway in Florida where the 4-minute race has been turned into an event that lasts for *hundreds* of laps. The big question is, however, how do you get a battery-powered car that's intended to run for 4 minutes to run so many laps? The answer, of course, is that you make pit stops for battery changes. Just like the races run by the big boys, pit stops can make a difference between winning or losing a race, and professional racing teams are always looking for better performance in the pits as well as on the track.

This attitude has influenced R/C racing—especially since superspeedway racers find that most of the time spent in the pits is spent changing batteries. Soon after superspeedway-type events started to become popular, after-market manufacturers went to work on the development of a quick-change battery system. Many of the factory racing teams soon appeared at the track with quick-change systems in their cars, but major modifications were often needed.



PHOTOS BY STEVE POND

How did the systems do? They were very successful, but although the necessary modifications were easy for the factory teams to make, they weren't too easy for the rest of us.

With this in mind, Lazer Lite's designers took their already flexible Shadow race car one step further, and they now give us the Shadow Quick Change car kit. Now *you* can have a most versatile on-road car that comes with the factory-team, quick-change, battery system.

THE KIT: For this review, I worked with the Deluxe Graphite Quick Change kit, which provides a complete rolling chassis with pre-mounted and trued tires and wheels. This kit is an advanced-level, on-road car for those who have a good working knowledge of on-road car technology and electrical component matching. The car comes fully assembled, and you only need the running gear to get it moving.

To complete the package, I used the Futaba* Magnum Jr. radio with an S-132 steering servo, a Pro-Zeta programmable speed control from PDI*, a Cam* modified motor, and the Chevy Lumina grand national body from McAllis-

LAZER LITE SHADOW QUICK CHANGE

Type On-road
Scale 1/10
Sug. Retail Price \$249.95 (deluxe)

DIMENSIONS:

Overall Length 15 inches
Width 8.5 inches
Height 5.25 inches
Wheelbase 10.5 inches
Front Track 8.25 inches
Rear Track 8.5 inches

WEIGHT:

Gross (w/bat.) 46 ounces

BODY:

Type McAllister Lumina (not included)
Material Polycarbonate

CHASSIS:

Type Pan
Material Graphite

DRIVE TRAIN:

Primary Pinion/spur (not included)
Transmission Direct-drive
Differential Ball-type
Bearings Ball bearings

SUSPENSION:

Front: Type Coil spring
Dampening None
Rear: Type T-plate
Dampening Suspension rod (twin)

WHEELS:

Front: Type BBS-style nylon
Dimensions (DxW) 2x1.25 inches
Rear: Type BBS-style nylon
Dimensions (DxW) 2x2 inches

TIRES:

Front/Rear AJ's Twinn-K Black Dot
foam

ELECTRICS:

Motor 05/540 (not included)
Battery 6- to 7-cell stick pack
(not included)
Speed Controller Electronic
(not included)

OPTIONS AS TESTED:

Futaba Magnum AM radio w/S-132H servo; PDI Pro-Zeta; Cam Super-speedway motor; McAllister Chevy Lumina body; Paranoid steel spur-and-pinion gear; Trinity 7-cell battery pack.

COMMENTS:

A unique design feature of the Shadow allows for front-suspension adjustment of camber as well as of caster and toe. The Quick-Change system is solid and easy to use during superspeedway-racing pit stops. A weak steering-servo mount is easily fixed; otherwise, the Shadow is a true high-tech performer.

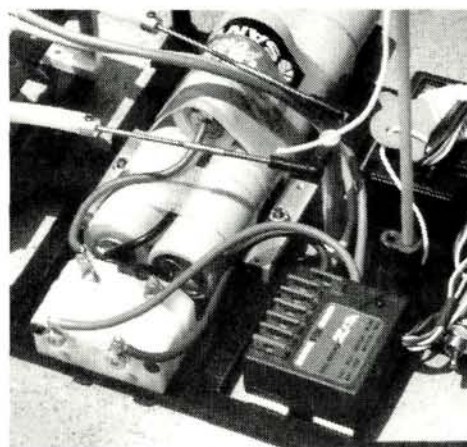
SHADOW

ter Racing*.

The Shadow Quick Change kit comes with a seven-page assembly booklet for the car, a one-page instruction sheet for the quick-change battery system, and a helpful photo sheet. (You'll really appreciate this when you want to take the car apart to maintain it or to replace any worn parts.) Two of the booklet's seven pages are devoted to very useful tuning tips that are extremely important for helping you set up the car. It gives you instructions for high-banked oval racing and roadcourse racing, and it also includes chassis-tweak tips, which will help you make the Shadow give its all.

The step-by-step instructions are easy to follow and, for each step, there's a corresponding parts bag for easy identification of parts. The Lazer Lite team even gives us building tips that are up front, and *not* at the end of the instructions, when it's too late.

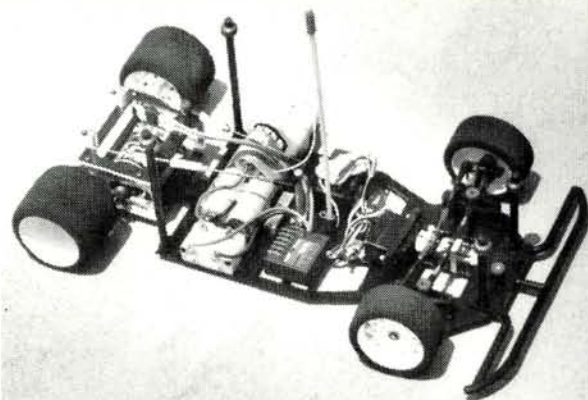
The kit's components are finely finished and fit exactly as they should, without modification. Remember, however, that this kit is a rolling chassis only, and that you'll have to get a servo-saver that suits your needs. Since the manufacturer



A close-up of the Cheetah Quick Change System used in the Lazer Lite Shadow. The PDI Pro-Zeta is wired to the tabs on the locking blocks.

has no way of knowing what type of servo and servo-saver you'll be using, you'll have to alter the steering turnbuckles to ensure a proper fit. This is the only modification you'll have to make, and it requires only some minor cutting.

The Shadow has the suspension features that you'd find on a full-scale rac-



This overall shot shows the latitudinal battery placement.

ing car. On its front suspension, you can adjust the toe, the caster and even the camber. Further, just like on a full-size racer, you can make all these adjustments independently of one another. Are you wondering why all these adjustments would be needed? If you've ever driven on a high-banked oval, you'll know that if you don't have this kind of adjustability, your car will "eat" its tires without regard for your wallet.

The rear suspension of the Shadow is as adjustable as that on the front. The twin suspension support posts perform just as a traditional oil-filled shock would, but they weigh about 75 percent less. The T-plate has a number of mounting holes that allow you to set up your car for a short or long wheelbase, and to make ride-height adjustments for any type of track conditions. The design of the rear pods will even allow you to reverse the graphite axle so that you can adapt your car to the Hyperdrive belt system, with the motor mounted on the left side of the car.

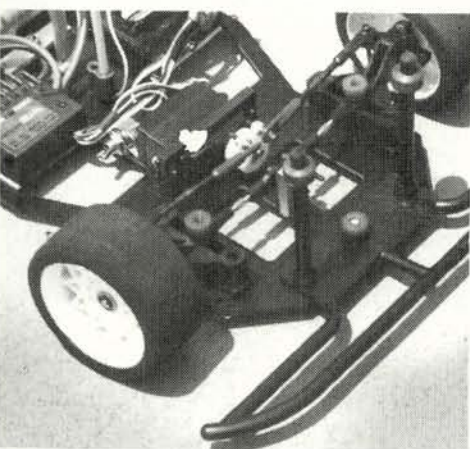
Lazer Lite has incorporated the Cheetah Racing* QC System into the Shadow. This is a plug-in, quick-change battery system that will enable you to use a pre-assembled, 6-cell, flat pack, a 7-cell pre-assembled hump pack, or your own custom-assembled pack. They'll all work, whether you decide to center or offset the mounting of the system. The quick-change system lies across the chassis and releases the battery pack with just a push of a button; the next pack should be ready to be plugged in.

This entire process takes no more than a couple of seconds. That's *quick*! If you ever decide that you no longer need the quick-change feature, you can revert to using any combination of the Shadow's 10 pre-slotted battery locations simply by removing two screws on the system.

PERFORMANCE: With all the Lazer Lite Shadow QC's components in place, my first stop was R.C. World in Danbury,

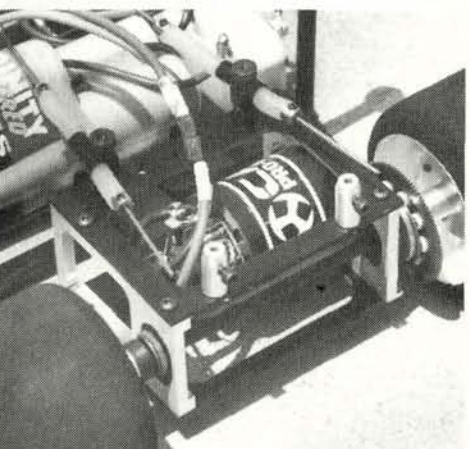
CT. As far as I know, this is the only concrete superspeedway in New England.

After a few slow warm-up laps, I put the Shadow on the bench so that I could fine-tune the suspension before getting heavy with the throttle. This is where the Shadow's adjustable suspension is great. With a quick turn of a turnbuckle, I ad-



Above: The Shadow's front end has a unique center post that enables you to change the camber with adjustable rods.

Below: A CAM motor provides the locomotion. Notice that the suspension rods attach to the rear pod.



justed the toe, and I set the camber to prevent the right-side tires from taking all the beating on the banked turns. I also found that by increasing the camber of the right front tire, it would wear more evenly, and not "cone" to the outside. This greatly reduces tire wear.

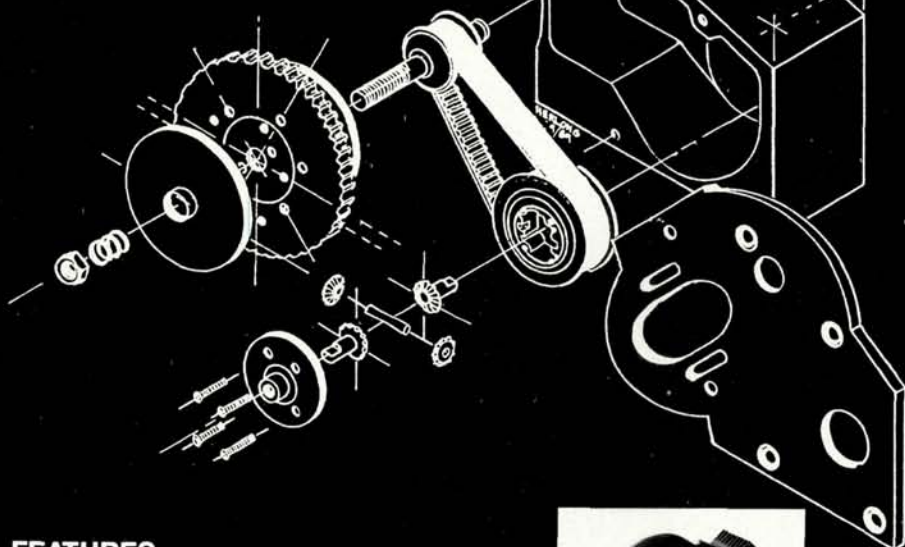
After some minor suspension adjustments, the Shadow's overall performance was remarkable. I'm not a world-class driver, but the ease with which the Shadow made it around the track—even at some very scary speeds!—was exciting.

Even with a complete novice to the system making pack changes, the quick-change system worked without a hitch, and only one component seemed to suffer when

(Continued on page 200)

NEW PRODUCT RELEASE

BRP PowerGlide

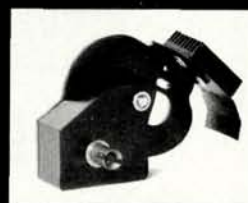


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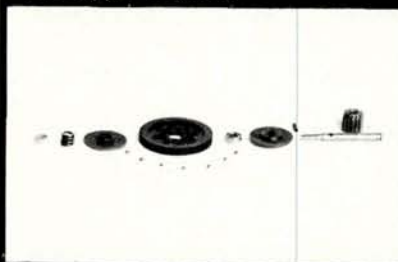
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5000 RC-10 Trans
5001 Ultima Trans

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- Optima Mid
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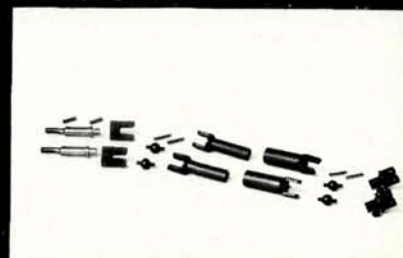
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ARISTO-CRAFT MOTOR CONDITIONER

by JOHN RIST

Tune your motor for optimum performance



YOU'RE RUNNING hard in the final heat before the main race of the day; you've scored enough laps in the second heat to make the A-Main; but something obviously isn't right, because the cars you beat in the first and second heats are simply pulling away from you. You head back to the pits wondering which adjustments you should make to your trusty racing motor to get it back on track. With only 1½ hours till the start of the A-Main, the guesswork becomes feverish.

Back in the pits, you disconnect the motor from the speed controller and plug it into a fresh battery. The motor sounds OK...or does it? Who can tell just by listening? In the past, you've always track-tested the car when you made a change, and lap times always told you whether the car was hot or not. Of course, on race day, the track is busy and time is short.... This story needn't have a sad ending, because Aristo-Craft* has introduced its Motor Conditioner.

I received one of the first Motor Conditioners so that I could work on writing the instruction manual. To complete this

assignment, I spent a lot of time with the unit, and I've successfully used the Motor Conditioner throughout the summer racing season. The Motor Conditioner has these features:

- Can measure no-load current.
- Current-level adjustment knob to control the voltage applied to the motor.
- Direct-connect switch, which enables you to apply full battery voltage to the motor.
- Tachometer for measuring rpm. This has high range for measuring no-load rpm at full power (direct-connect "on"), and low range for checking the stability of the motor when operating below 5,000rpm.
- Precise control of current/rpm for break-in of new or reconditioned motors.
- Condition meter that determines condition of brushes and bearings.
- Timing meter that establishes neutral timing point.
- Verifies correct direction of end-bell rotation to achieve a timing advance for both forward and reverse running motors.
- Optimum timing. Once established, this may be maintained.
- Price of \$119.95.

The Motor Conditioner is basically four instruments in one: a current meter; a tachometer; a timing-point meter; and a motor-condition tester.

The Motor Conditioner also has a variable voltage supply, so you can run the motor at less than full speed, and it's powered by a standard 6- or 7-cell battery pack. During my tests, I found that both worked well.

Early in the instruction book, there's a suggestion that you keep records on your motors, and at the back of the book, there's a chart on which you can keep these records. This is a good idea, because the purpose of the Motor Conditioner is to help you identify the hottest motor in your stable, make it even hotter, and keep it that way. To do this for a given motor, you must use the same type of battery each time so that the numbers obtained during a test can be realistically compared with those previously obtained.

The Motor Conditioner performs many functions. Let's look at the instruments one at a time:

The current meter. This is a 7-amp meter that's redlined at 4 amps and is designed to measure the no-load current of a motor. When selecting and setting-up a motor, it's always a trade-off between low current draw (run time) and high performance. In the "warning" section, it says that you shouldn't use the Motor Conditioner to test hot competition motors that draw more than 4 amps, no load. In use, I discovered that my favorite stock motor draws 2.4 amps and my favorite modified motor draws 2.5 amps. I'm sure that there are motors that pull more than 4 amps, no load, but because their number is limited, I don't feel that this restriction will limit the usefulness of the Motor Conditioner.

Record keeping is important, because if you have a record of the current draw when the motor is at its best, a current increase will indicate a malfunction: Poor

(or dry) bearings, dirty or loose brushes, dirt between the armature and the magnets, and slipped timing will all make the current rise. One of my motors developed a shorted turn; it drew so much current that it blew the 10-amp fuse. In this extreme case, the motor lab (rather than my speed controller) took the abuse, and it told me *instantly* that I had motor trouble, not trouble with my speed controller.

parts of the motor.

The tachometer is also useful when breaking-in a motor, because the Motor Conditioner current-level adjustment allows you to run the motor at less than full speed. The tachometer can be used to set the motor rpm between 3,000 and 5,000rpm, as recommended in the instruction book.

The timing-point meter. This was

The Motor Conditioner is four instruments in one: a current meter; a tachometer; a timing-point meter; and a motor-condition tester.

The tachometer. If you race seriously, this instrument alone is probably worth the price of the Motor Conditioner. Accurate knowledge of the no-load rpm of a motor will tell you more about it than any other test you could run (short of a full dynamometer test). Consider stock motors: They aren't all created equal. It's a tremendous advantage if you can sort through your collection and pick your hottest one.

You can also observe the effects of different styles of brushes. In short, when you make a change, you can test the motor to see if its performance is better or worse. The Motor Conditioner will allow you to take actual meter readings and evaluate the changes you've made.

The upper limit of the tachometer is 40,000rpm. This will handle most motors, although my best Twister motor is logged in at more than 40,000rpm. A few words of caution: *Don't* run hot modified motors in the direct-connect mode for long periods, because the excessive rpm may damage the bearings. Always make sure that the bearings have been oiled, because dry bearings generate heat, and heat destroys bearings and can damage other

disappointing. If you're very careful and follow the supplied instructions, you might get a useful reading from the timing-point meter, which is supposed to show you the zero timing point (sometimes called the "neutral running plane"). This is the point at which the motor draws minimum current but still produces high rpm. I tested several motors and found that on some, there was enough meter movement to determine the zero timing point, but on others, the reading was unreliable.

But all isn't lost: The instruction manual describes another method of finding the zero timing point whereby you watch for minimum current while rotating the motor's end bell. You can then continue to fine-tune the end bell's setting while you watch for maximum rpm. This method has worked well on the motors I've tested.

The Motor Conditioner can also be used to advance a motor's timing. The zero timing point is the most efficient, but if you want to increase the motor's *maximum* rpm while reducing run time, you can advance the timing. As a rule, $1/16$

(Continued on page 200)



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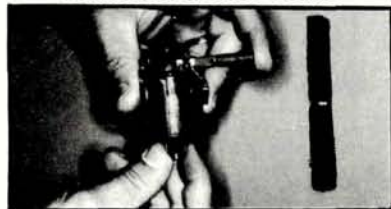
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NORRCA NATS

(Continued from page 138)

sorship and armed with his new Rocket Wedge body, managed to take over the point position with less than a minute left in the race. Landgraff took the win, with Strawn in 2nd and Griffith in 3rd. Landgraff posted the only 40-lap run in this race with an amph of 270.

Outlaw Sprint A-Main

John Hammer Smith, the nation's premier R/C sprint driver, is a virtual powerhouse in this class. His Peak Performance-powered JG/RC10/J-Car, shot off the Pole with his trademark wheel-stand and dominated the entire race! Jim Gouge, with a Twister-powered Ascot/RC10/Fast Eddie transmission, battled for 2nd place with Rick Atwood's Cheyenne car, which is better known as an entry-level type. Other than a Thorp tranny and a Twister motor, the Cheyenne was basically stock, but Atwood gave the factory-sponsored drivers, with their more exotic rigs, a good run for their money. Meanwhile, Smith was picking off back markers one by one. When the dust had settled, Smith was the

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HIROBO INVADER

(Continued from page 72)

front diff housing. A large hole, offset to the right of center on the rack, is filled with a plastic pivot-ball receiver. Install the servo-saver that's included in the kit, then screw a pivot ball into the servo-saver arm. It's an effective way to steer the car without resorting to gawky steering rods set at nearly impossible angles,

but it's not something that you can just throw together without some thought.

The steering shaft should be lubricated before you put it into the housing. Use a good lithium-based grease or Slip It! It should be something that will coat and stay with the shaft, because unless you disassemble the steering, you won't have an opportunity to do it again.

As for the rack itself, if you try to mount it low and close to the chassis,

you'll find that the pivot ball, as well as the screws holding the pivot-ball receiver in place, all rub against the differential housing. It's not a pretty sight, and it doesn't turn the wheels very well, either.

You have quite a lot of latitude in choosing the rack angle, so use it. Chop the bottom row of mounting holes off the servo-saver, then clip back the left and right holes from the single row that remains. This will leave you with a triangular shape. Screw in the pivot ball and test-mount the steering servo; note how far above its mounting platform it must be to keep the whole assembly clear of the housing.

Start filling in the gap between the platform and the servo with double-sided tape. The tape will compress slightly after you install the servo and snug it down with the included tie-wrap, so build up the height until it's slightly higher than you need. Set the servo down (standard sizes will fit; miniservos are better; and micro-servos are an unnecessary expense), strap it in, and you should have a responsive car with no steering drag.

(Continued on page 160)

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HIROBO INVADER

(Continued from page 158)

The next-to-last hurdle is the radio gear. There's room for everything you have to put there, but you'll need to look for it. The battery placement is obvious, and the receiver is mounted against the bulkhead immediately behind the steering servo. Although full-size receivers will fit, the smaller, the better. The JR Alpina pistol-grip radio fit the bill quite well.

Electronic speed controllers are another

matter. Your best choice here would be something in a case that looks like a servo, e.g., a JR* or a Futaba*. (I used the JR ESC 900.) Then you can just mount it in place of the servo that would have been used for the mechanical speed controller. Barring that, you might be able to squeeze a small ESC onto what would have been the resistor mounting bracket. This will give you the added benefit of having direct airflow to the heat sinks through the body cutout.

When you have everything else put together and are just about to mount the rear wing, don't bother. A friend of mine also has an Invader, and neither one of us has yet to find a mounting method (short of gluing it to the body) that will keep the wing in place after the first jump. It's just not worth the effort. The wire supports are supposed to slip into the body-mounting posts and then be held in place by the body clips, but it doesn't work that way. The wing stubs sprouting from the side of the body seem to provide all the ground force you'll need anyway.

PERFORMANCE: I took both the Alien and the Invader to the track. I had an AYK* Eliminator 15 motor and a Tamiya* EX SCE battery in the Alien, and a Speedworks* stock motor and a Tamiya SC battery in the Invader. (I like to stack the deck!) Of course, the Alien was faster—much faster—but the Invader tracked steadily and ran smoothly and consistently. It was a little jerky across the road lumps, but I cured this with some suspension tweaking, just as I had done with the Alien years before.

(Editor's Note: The Surgeon General does not recommend the following for the

(Continued on page 176)

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HIROBO INVADER

(Continued from page 160)

health of the Hirobo Invader. We are not sure of the mental stability of the author. His nickname is, after all, "Bad Brain.")

I pulled out the Speedworks motor and shoved a Trinity Big Daddy in its place. This is a 10-turn, double-wound motor that's aimed principally at the drag-racing crowd. It's a good thing the Invader only had wing stubs; otherwise, I think it would have taken off!

As it was, it ran faster than a cheat before motor inspection, but it had absolutely no duration with a 1200mAh SC battery. It also showed me where I had neglected to use screw-locking compound on the drive pinion in the rear differential. Luckily, Hirobo uses a removable, clear, acrylic cover on the housing to permit access without disassembly of the unit, so I had things back to normal in no time. Make sure you really glue those tires onto the wheels: Under high rpm, they can come loose if you do a poor job.

Surprisingly, no matter how hard I pushed them, neither car would flip in the turns. I'm not exactly certain what Hirobo has done, but apparently, the weight dis-

(Continued on page 179)

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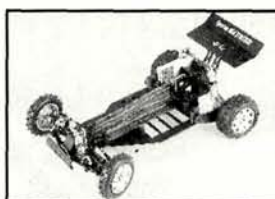
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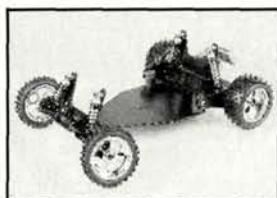
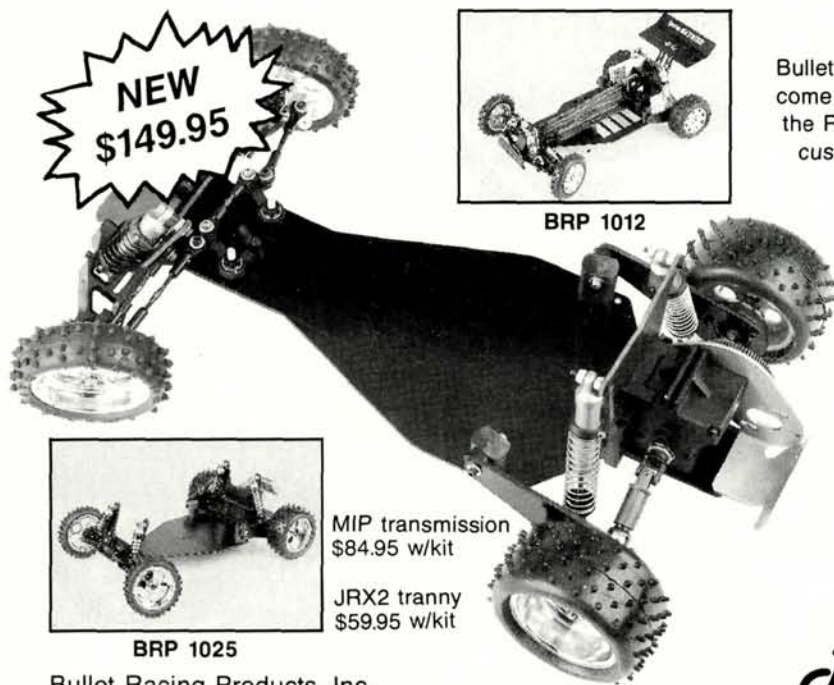


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Also pictured is the BRP 1025 Ultima competition kit and Bullet's new Optima mid stretch trailing arm kit (BRP 1012). Not shown is the RC-10 competition kit (BRP 1110).

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HIROBO INVADER

(Continued from page 176)

tribution and suspension are balanced enough to keep the wheels where they belong: in the dirt. I'm sure I could flip it if I really tried, but the Invader didn't want to do it on its own.

I did manage to break a front suspension rod, but this wasn't the Invader's fault. To adjust the camber earlier in the day, I used a screwdriver to pry the rod end off a pivot ball (not a good idea!), and I managed to fracture the rod end in the process. It held through most of the day, until I came off a jump and landed on the right front tire. Had I not turned the wheel full-lock right in anticipation of a skid, I doubt that the rod end would have been stressed enough to break; but it was, and it did!

I was bothered by the grit that got into the rear diff. Apparently, there's no solid seal between the open floor of the chassis and the polycarbonate underpan. The grooves formed by the wing stubs allow dirt to work into the body. The dirt becomes trapped around the rear differential and works its way into the diff. It's easier to prevent the problem during assembly: To seal the area, glue some felt around the bottom of the chassis and around the cutout for the diff.

Except for the differences in the body wing and the chassis plate, the Alien and the Invader are essentially the same car, and this leaves me with the same lack of performance parts that I had with the Alien. Fortunately, the lightweight Invader chassis needs little modification and, if you want to shed the stub wings, you only have to trim the polycarbonate lower pan back to the chassis rails, and you'll be able to mount any body that you want.

Wheels and tire swaps were something I discovered by accident while playing around with an Optima Mid and some Avante wheels. The drive nuts that come with the Avante wheels can be mounted on the Invader axles *on top of* the existing drive nuts, and this lets you mount Avante, Kyosho, or Bru-Line wheels. This small piece of information grants you access to a variety of tires, e.g., Tamiya, Kyosho, DuraTrax, Imex and Pro-Line.

There's also a huge array of motors designed for an equally large number of applications, and they're all waiting to be plucked from the electric tree at your local hobby shop. Let's face it: We've been Invaded!

**Here are the addresses of the companies mentioned in this article:*

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Speedworks; distributed by Trinity, 1901 E. Linden Ave., #8, Linden, NJ 07036.

KING 8 SUPERNATS

(Continued from page 86)

for the first half of the race, was involved in a tangle with Roger Hollingsworth, and that took him out of the competition for the lead while Hollingsworth was sent packing, owing to a broken panhard rod on his car's front end.

Brazil and Luther, running neck and neck, continued to swap 1st and 2nd, while the determined Kyes took 3rd and was closing in. As the lead pack was coming around on some lapped traffic, Brazil tangled with Epperson, and this let Luther and Kyes around before he could get back up to speed.

At the restart, Brazil, who was able to close the gap under the yellow, was back in the race when he again came around and was tagged by Epperson once more. Even though Brazil managed to keep his car in shape, the contact scrubbed off a lot of speed, and Kyes sped past him, followed by Luther. Another yellow flag tightened up the pack, and this allowed Brazil to close up once again. With only a few laps remaining, the green flag flew again, and it was anyone's game. Crossing the line for the white-flag lap, Kyes gave it the heavy finger and sprinted to the front of the pack. As he sailed down the back straight and into three and four, he came alongside Brazil and was challenging him for the lead when they made contact. Kyes went into the hay bail and Brazil went on to claim the checkered flag, followed by Luther.

Next was the Supermodified A-Main headed by Chris Rahe. Undoubtedly the fastest qualifier, he would be tough to beat, but he had some strong competition. Jens Jorgensen was worth keeping an eye on. After sweeping the B-Main, it was easy to see that if he made a clean run, he would be a contender, despite his last-place start in the A.

Just as expected, when the green flag flew, Rahe leaned into the throttle and stretched out his lead. By the time the cars made it onto the back straight, Jorgensen had already moved right into 4th spot. Running more smoothly than the sprinters, the Supermods made it through the



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A-Main with only two yellow flags.

Only a couple of laps into the race, Jorgensen made a pass on Paul Disbro and moved up to 3rd. Meanwhile, Gus Gustafson was making a strong move for 1st place, but the awesome power and driving skill of Rahe kept him at the head of the pack. Gustafson got caught in traffic, so Jorgensen had the chance to get past 2nd place. Jorgensen moved from 2nd to 3rd while running alongside. Gustafson spun on the back straight, so Jorgensen took second for good.

With nobody between them, Rahe and Jorgensen leaned into it, knowing the end was near. Then, car number 43 (driven by Van Cox) lost a front wheel, and this brought out a yellow flag. Only three laps to go and 1st, 2nd and 3rd were within 5 feet of one another! Rahe heard the restart first, as he got the jump and stretched his lead to 20 feet. Jorgensen made his move and was picking up ground, but the white flag left him sitting in 2nd as Rahe held him off for the final lap to take the checkered flag.

The final (and longest) race was the 150-lap A-Main for the Grand National cars. Running 150 laps with the Grand Nationals requires that the cars refuel at

(Continued on page 194)

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by WALLY DAVID

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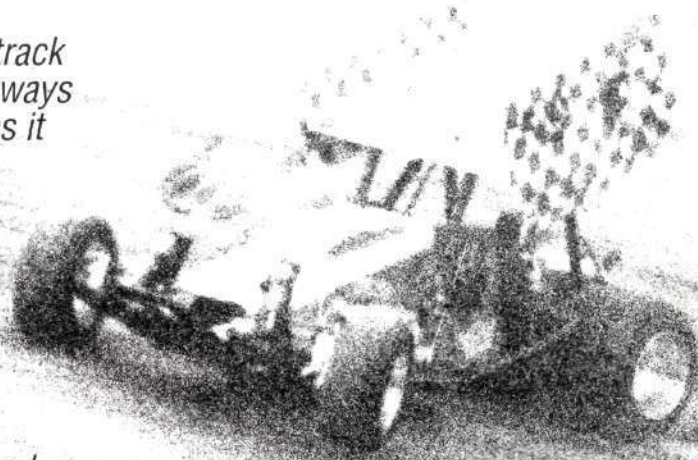
When two cars are close, you never know what's going to happen; that's the reason for the roll cage and nerf bars. These pieces of metal tubing are your protection from intruding wheels, and they'll keep you in one piece if you flip—and you will! Usually, you'll walk away to race another day.

You can experience the thrill of full-size sprint-car racing without putting yourself in danger, because conversion kits are now available to transform your 2WD off-road car into a tricked-out outlaw sprint car.

This started as a simple review of RCRC's* Ascot Challenger Sprint Car conversion for Associated's* RC10. As the project took shape, however, I found many other accessories that I wanted to use, so I developed this into "Project Sprinter."

THE KIT: The Ascot kit includes a narrow, fiberglass chassis, aluminum roll cage with nerf bars, and a rear nerf bar. A set of lightweight plastic headers is included, as is all the hardware needed to mount the cage to the chassis and to mount a pair of short shocks to the rear of the cage.

THE CONVERSION: The first step in the transformation was to finish the roll cage and nerf bars. I wanted a look that was different from the standard polished metal, and I wanted a red roll cage on my sprinter—that's all there was to it! Painting was out, as I didn't have the facilities to do a proper job (e.g., powder coating on 1/4-scale roll cages). Standard paints won't hold up to the abuse, and anodization costs more than I wanted to spend.



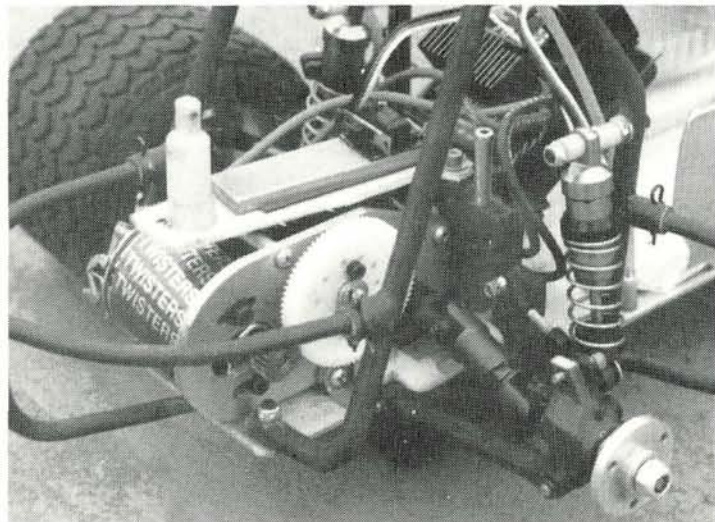
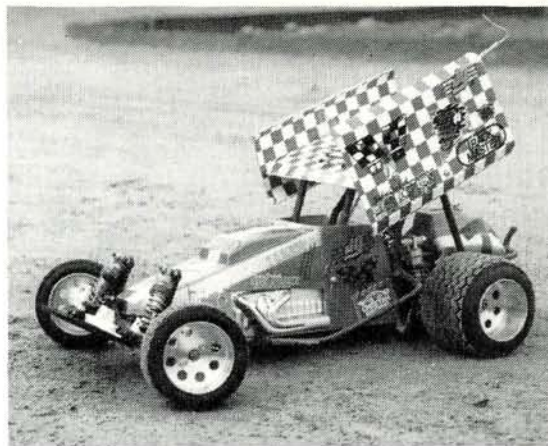
PROJECT SPRINTER

While I was deciding what to do, I noticed the nice coating on a pair of needle-nose pliers. Voilà! Now I had a way to make my roll cage red! At the hardware store, I found Dip-It, which is used to coat tools.

The process that follows is one of trial

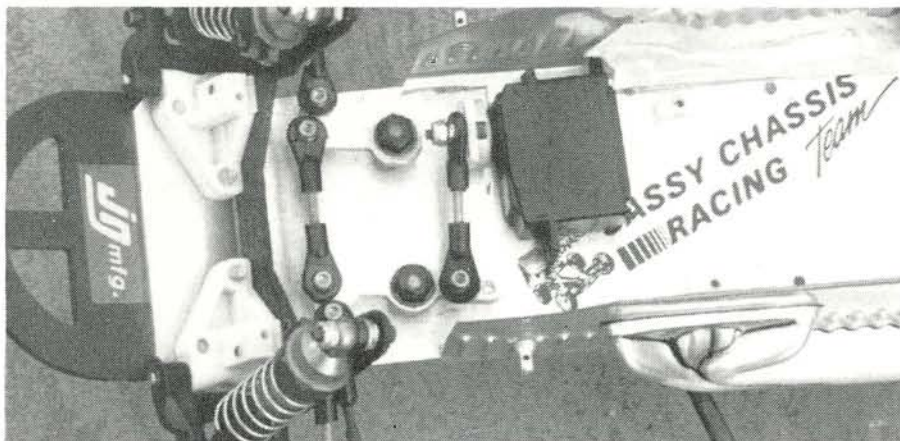
and error, and it took a little experimentation to achieve the right mixture of Dip-It and paint thinner. I dumped two cans of the rubber coating into a bucket and dipped the rear nerf bar into the bucket by suspending it with a thin piece of wire. The

Dip-It was too thick, so I added paint thinner and tried it again, but it was still too thick. I continued to add thinner to the Dip-It until I achieved a smooth, thin coating, and I repeated the process until the entire cage and the nerf bars were coated with the rubber covering. After each piece had been dunked, I lined my tub with newspa-



Above: The rear end of Project Sprinter features a Track Master Turbo Glide tranny, Bullet Racing's telescoping universals, and Robinson 48-pitch gears.

Right: Sassy Chassis' unique bellcrank allows the steering servo to be mounted farther forward than other units; this leaves space for the battery. Note the JG Manufacturing Ultra Light Body Posts protruding from the header plates. Below: Advance Engineering aluminum wheels and Grand Prix rubber tires complete the package.



per and hung the pieces from my shower curtain rod.

The result was a tough protective coating that produces a different-looking sprinter; and there's a good chance that no one will know what you used. In the near future, I plan to write an in-depth article on the coating process, and I may go for a two-tone job, so keep your eyes peeled.

Next, I attached all the RC10 components to the chassis. I decided to replace the very flexible fiberglass chassis with an aluminum one from Sassy Chassis*. This is a one-piece chassis, so there was no need for the stock nose piece, which tends to

bend. The Sassy chassis also has the rear mounting holes positioned so that the car automatically has 5 degrees of rear toe-in for extra rear stability.

The chassis also has aluminum bellcranks that are better than the other currently available setups. A sprinter lacks space, and

since most bell-cranks are L-shaped, the steering servo must be mounted lengthwise in the chassis to achieve a proper angle. The Sassy Chassis bellcrank is straight, however, and the servo can be mounted laterally so that it's much closer to the front of the chassis. Now there's more room for the batteries.

Mount the RC10 suspension components to the chassis as you would on a stock chassis, but leave the rear shock tower off, because the rear shocks will be attached to the roll cage.

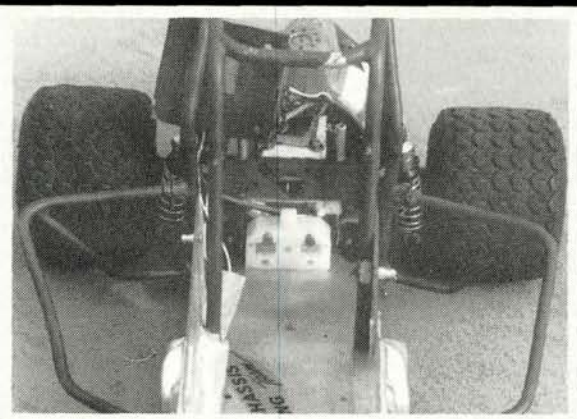
The next step is to mount the roll cage and the rear and side nerf bars to the chassis. Unlike the RCRC Supermodified kit, which I've reviewed in a previous issue, these instructions were pretty clear. Following the instructions and photos, attach

the roll cage and rear and side nerf bars to the chassis, using 4/40 button-head screws, locknuts and clips. Except for the screw that connects the left rear brace of the roll cage, make sure that you have the button-head screws installed from the bottom. On the left rear of the chassis, the screw goes through the chassis and roll cage and protrudes from the bottom of the chassis where it's secured by a locknut. If the nut is on the top of the chassis, it will interfere with the motor. The roll cage sat squarely on the chassis and no cutting was needed. The location of the polycarbonate side panels is left up to you, so just line them up with the chassis and drill holes, using the photo as a guide. They'll be held in place by the roll-cage hardware.

No provisions or recommendations were made about mounting the body or wing, so I called JG Manufacturing* for some advice. John "Hammer" Smith, who's the '88 and '89 ROAR Sprint-Car National Champion and the NORRCA '89 Sprint-Car National Champion, just happens to work for JG. What luck!

He told me that the new wing (patented after the one he uses on his Ascot sprinter) is pre-bent in three major sections and is held together with small screws and nuts. For supports, a narrow strip of polycarbonate is included, and this creates a very sturdy, yet flexible, wing that can withstand a lot of abuse.

Hammer recommends drilling out the holes in the top of the roll cage to fit 4/40 cap-head screws, which will be secured with locknuts. For the rear wing mounts, he suggests using Du-Bro* EZ ball ends.



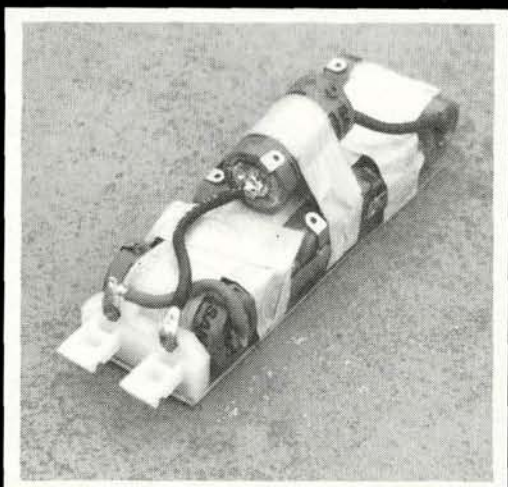
The white locking block of the Cheetah Quick Change system takes the hassle out of changing batteries.

brainstorm. What if I tried to put a Cheetah Racing Quick-Change system in my car? That would allow me to get the battery in and out easily *and* keep all the wires neatly in one place—no soldering, either! What a novel idea!

I called Carlos Turano, the ever-helpful owner of Cheetah Racing, to ask if anyone had been brilliant enough to come up with this before. I was crushed to discover that he has been using one on his sprinter for quite a while. Oh, well!

To install the Quick-Change system in the sprint car, drill holes following the diagram and assemble the unit according to the instructions. This arrangement makes everything in the car very neat, and it eliminates floppy wires.

At least I'm the only one in my area who has a QC system on his sprinter—well, for a while anyway!



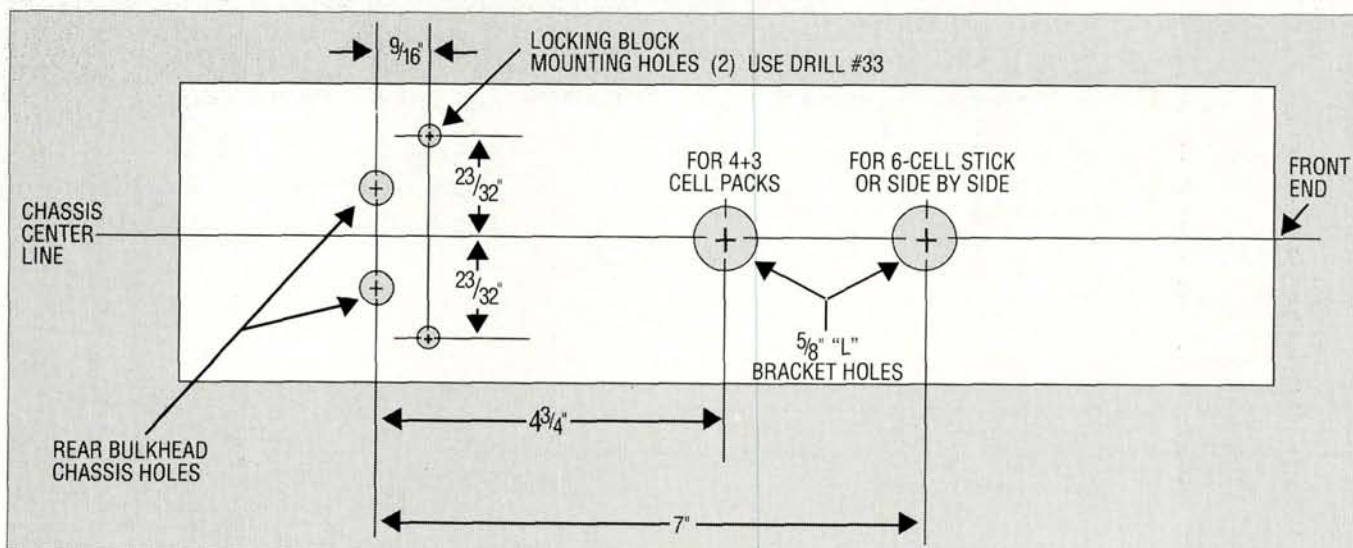
The 7-cell pack is taped and wired to the battery plate of the Cheetah system. NO MORE SOLDERING!

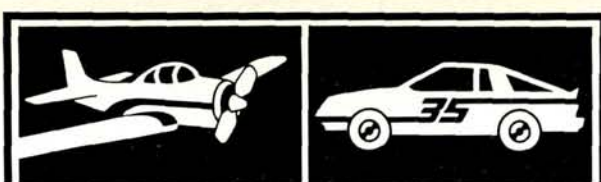
Remove the small adjustment screws and brass balls, and pop the ball end over the top, rear cross-bar of the roll cage. Holes should be drilled through the wing to correspond with the ball ends and the roll cage. I used a MonoKote* Trim Sheet to

achieve that nifty checkerboard effect!

JG's Ultra Light body mounts make attaching the body a breeze. These little aluminum mounts should be screwed onto the polycarbonate header plates so that

(Continued on page 206)





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KING 8 SUPERNATS

(Continued from page 179)

least once, so pit road was cleared to allow room for the pit crews.

Getting the jump on the rest of the field at the start of this long race was none other than the 1985 IFMAR 1/10 Off-Road World Champion and one of the top finishers at this year's Worlds, Jay Halsey. Driving his RACO Grand National, he soon set the track on fire.

After the first 10 laps, Kyes was a close 2nd. Halsey was still steaming around the track, and he was a definite contender for the win, when Dino Mowreader's number 6 car nailed him, taking him temporarily out of the race. This gave Rahe the chance to slide into the lead, but whatever problem Halsey had, his crew was able to fix it, and he slowly worked his way back up to 2nd place behind Rahe. The crippled Halsey could do nothing to catch Rahe as they drove through the traffic, lap after lap, until they reached about lap 90. Halsey's car began to billow smoke from the left rear, and everyone in the pits made guesses about its cause. "The tire is rubbing the frame," or "the engines are going to let go." It was neither of those problems, but it was an awesome sight as Halsey nursed the car around the track with smoke billowing from the rear. When Halsey's car was no longer a threat, Rahe just headed for home and never looked back.

Following the race, the tear-down to inspect the top cars began. This was to ensure that they hadn't been modified. Many of the racers headed home or to their hotels to clean up for the poolside awards ceremony that was to take place at the King 8. Only those with a vested interest in the outcome of the tech inspection stayed around to see the results. One of the nine cars inspected was disqualified because its engine had been modified.

Later, it was decided that the DWA was legal and the results would stand. The awards were made in the unseasonably cold Vegas night at the King 8 Hotel & Casino, which included dividing the top purse among the winners.

Credit must be given to the key people who made this huge event so smooth and enjoyable. Foremost is Kenny Higdon. Right from the first King 8, he has made tremendous personal sacrifices to make the King 8 a great event. Jim Lang and Ron McFarland from the King 8 Hotel & Casino, which sponsored the event, are also responsible for its success. With their enthusiasm for 1/4-scale racing

(Continued on page 196)

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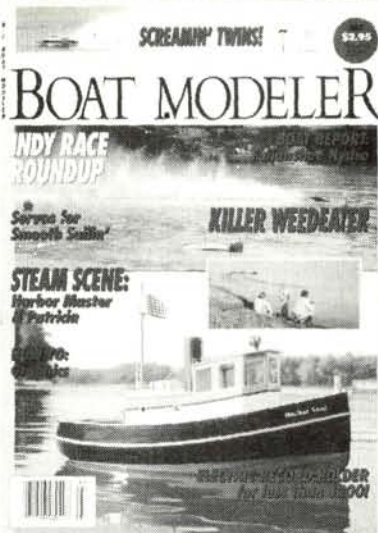
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KING 8 SUPERNATS

(Continued from page 194)

there would be no Supernationals. Thanks also to George Brazil, John Rahe, Toni Barrow, Georgian Love and Ralph Greco, all of whom also went out of their way to help.

Kenny Higdon has assured us that he'll be back next year, but only if the purse totals \$10,000! Rest assured, if Kenny wants a purse like that, he'll raise it. As for me, I'll be back!

DIRT DIGEST

(Continued from page 110)

Final Notes

After the rod was in place, everything went back on in good order. I won't bother to detail how I rewound the steel coil, since it's logical enough when you've started it and spent 10 or 15 minutes ranting about how impossible it is. Just remember that the inherent property of the coil is that it compresses.

The engine's back in the RS-200 now, and it's humming along. By the way, the "B" designation in .10 FP-B indicates that it's a buggy (off-road) engine rather than a racing (on-road) engine, which would have an "R" appended to its name.

While you have the carburetor off, you might want to reorient the fuel-metering system (that's the tall mixture assembly). As it was installed on my car, the inlet for the fuel faced away from the direction of the fuel line, and this gives the line a U-bend to make the connection. If you loosen the bottom locknut on the block, you can swivel it around in the correct direction.

Next Month

The immediate future looks like pot luck. I've just started a new truck (probably a semi) that's going to be an interesting off-road vehicle if I get it finished the way I want to. The cab and the trailer will be independently powered (tease, tease), and I still have a load of cars that I haven't finished assembling.

Between then and now, we'd like to hear from you. Bob has that polyurethane look in his eyes again, and I just got the last of my clothes back from the cleaners (besides, the only thing left to polyurethane is this keyboard I'm using). We'll be back in a month—you be here, too!

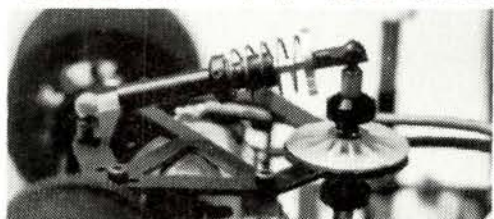
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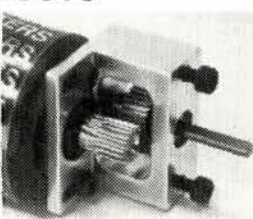
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2 to 1 Gear Reduction Transmission

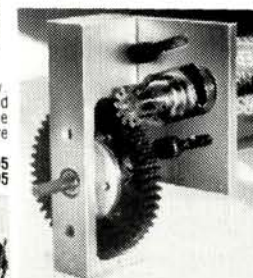
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ASTRO DRAG SET-UP

(Continued from page 118)

tronics and powered it impressively with the Top Fuel II motor. The best E.T. of the afternoon was .5 second off competi-

tive times, and that was without adjusting the attack angle on the wing, without adjusting the motor's timing, without using traction compound on the tires, and without adjusting the gearing, or changing the programming of the PDI controller.

We did everything we could do to handicap the motor, and all it did in return was smile politely at our attempts and boogie on down the road. All right; I'm impressed. Of course, 10 cells is just a starting point for the Top Fuel II motor; an AA/Fuel Rail can run up to 20 cells. If you're staying in the 10 or 8-cell range, try Astro's regular Top Fuel I motor. It's faster at those cell categories. I admit it! The Astro Drag Setup wasn't a drag!

*Here are the addresses of the companies mentioned in this article:

Team Astro/Astro Flight, 13311 Beach Ave., Marina Del Rey, CA 90292.

Fine Design & Manufacturing, 2 North St., Middletown, NY 10940.

Futaba Corp. of America, 4 Studebaker, Irvine, CA 92718.

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ROOTS OF R/C

(Continued from page 133)

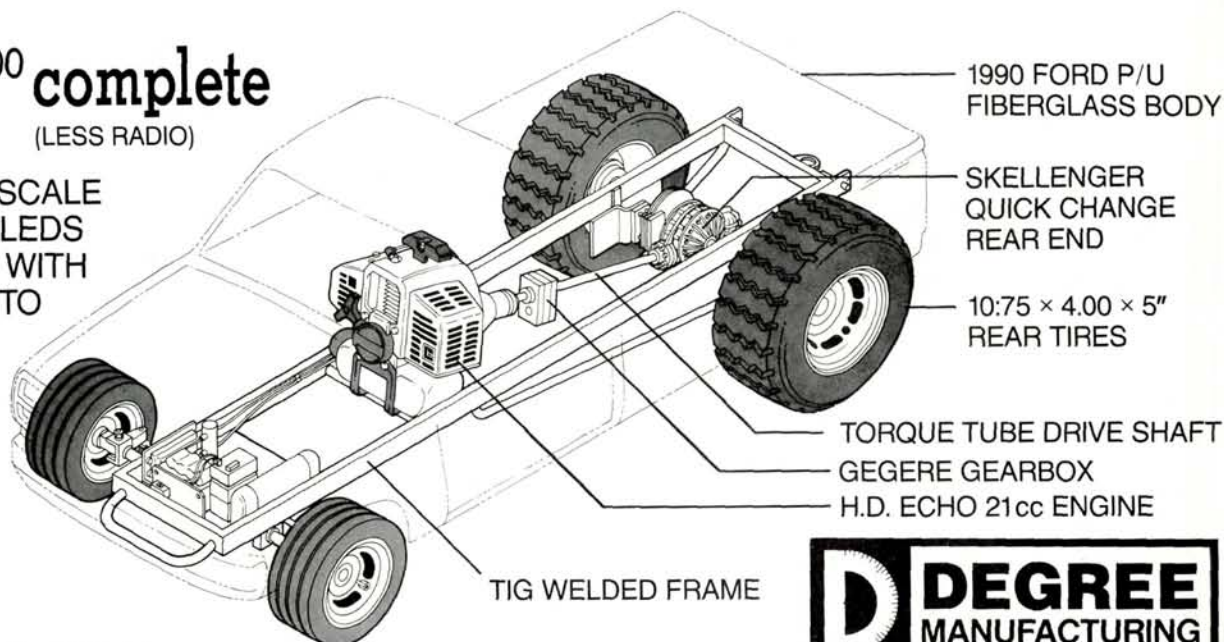
'85. It had many of the features of the RC10, including lightweight suspension components, coil-over shocks and a smooth gear differential. In its box-stock form, it was no match for the RC10, but with some modifications, it was definitely a threat. In 1987 at the second IFMAR

(Continued on page 200)

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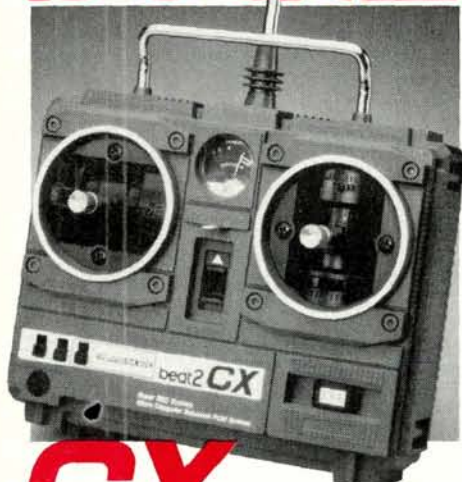
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ROOTS OF R/C

(Continued from page 198)

World Championships in Romsey, England, the Ultima made a permanent mark on the R/C world. Driven by Joel Johnson, it streaked to a victory in the 2WD class.

Just when Kyosho was developing the Ultima, a 4WD car—the Optima—was conceived, and it came in right on the heels of the Yokomo Dogfighter 4WD. Although the Optima was a bold competitor, it was unable to beat the performance of the Dogfighter. With the exception of Yokomo's rear trailing arms, these cars had similar suspension components and both used the very efficient chain-drive system. The Optima used gear-type differentials, front and rear, and this was ideal for four-wheelers, but the Yokomo's superior design, with its more versatile ball diffs and center slipper clutch, was enough to keep it in the winners' circle.

Since then, a number of off-road cars have been introduced in the 2WD and the 4WD categories. Cars like Kyosho's Lazer ZX, Yokomo's YZ-10, Team Losi's JR-X2, Schumacher's Top Cat and Pro Cat, and the new 2WD prototype from Associated (which dominated the 1989 World Championships), are all testaments to the ever-improving technology that has brought us faster, more reliable, performance machines.

The latest products from these manufacturers indicate that the R/C car hobby shows little sign of slowing down. As the manufacturing technology improves, you can expect to see even more progress toward faster, more dependable R/C machines!

LAZER LITE SHADOW

(Continued from page 143)

the car hit the wall: The kit's steering-servo mount is a frame-type mount that goes around the servo and is then secured to the chassis floor. This mount couldn't withstand the shock of the high-speed crash endured by my test car. During the test, I removed this mount and used servo tape and a tie-wrap to hold the servo; they held up without a problem.

I later found that the manufacturer was already aware of this problem and had addressed it in the final production kits. A heavier mount is now being used, so this problem has been eliminated.

The Lazer Lite Shadow QC is a really hot performer and will, no doubt, be a force to reckon with on the superspeedway and the roadcourse. Keep an eye out for it; I'm sure you'll be as impressed as I am.

*Here are the addresses of the companies mentioned in this article:

Lazer Lite Racing Systems Inc., 2090 SW 71st Terrace, Unit H9, Davie, FL 33317.

Futaba Corp. of America, 4 Studebaker, Irvine, CA 92718.

PDI, 16922 NE 124th St., Redmond, WA 98052.

Cam Racing Motors, Rt. 3, Box 680, Huntersville, NC 28078.

McAllister Racing, 2245 First St., Unit 105, Simi Valley, CA 93065.

Cheetah Racing, 10823 Amestoy Ave., Granada Hills, CA 91344.

MOTOR CONDITIONING

(Continued from page 145)

inch of rotation gives 5 degrees of timing advance, and it isn't advisable to advance the timing more than 20 degrees (1/4 inch). To advance the timing, rotate the end bell

(Continued on page 205)

COMPETITION BATTERIES

"EVEN IF YOU COULD
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SUPER STOCK	OFF ROAD, ON ROAD	635-659	7.00
ULTRA STOCK	OFF ROAD	620-634	4.50

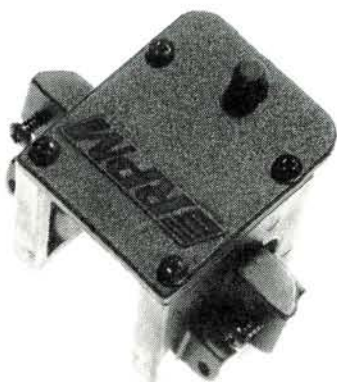
RUN TIME
BATCH #
TEST DATE
AVG. VOLTS

COMPETITION BATTERY SALES
32588 Dequindre, Warren, MI 48092



313-588-2740
3:30 to 7:00 p.m. E.S.T.

WHAT'S NEW



RPM Yokomo Bulkhead

This injection-molded-nylon front bulkhead is designed for a snug fit on the bearings with 360-degree bearing contact, which prevents the bearings from vibrating and wearing out the bearing seat even more. Motor sprays won't affect the nylon, and it won't oxidize like the stock magnesium bulkhead. The black nylon is also guaranteed not to break, and the "open" design makes it easy to clean dirt from between the uprights. The arms and shock tower have been tilted backward about 4 more degrees to add more caster to the front end, and this allows the suspension to absorb the bumps more easily. The RPM front bulkhead is also 25-percent lighter than stock! No. 7500 YZ10 Front Bulkhead. Price: \$18.95.

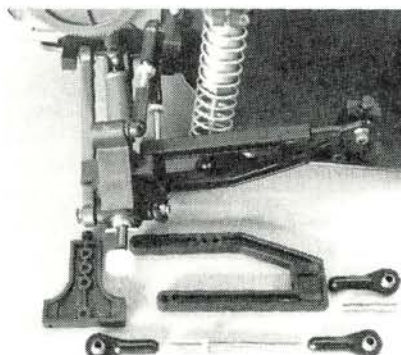
For more information, contact RPM, 14978 Cierra Bonita Lane, Chino, CA 91710.



MCALLISTER RACING Nissan 300 Z

The new Nissan 300 Z from McAllister Racing will wake up your competition. This is the IMSA GTO version with flared fenders and racing trim. Part no. B-132; Price, \$20.

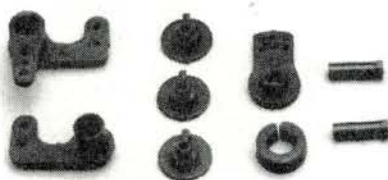
For more information, contact McAllister Racing, 2245 First St., Unit 105, Simi Valley, CA 93065.



LUNSFORD RACING JR-X2 Swing-Arm Kit

Lunsford Racing's newest product is the Rear Swing-Arm Kit designed for the JR-X2. This nylon swing arm increases rear travel for better stability through rough sections of the track. Most notably, it decreases front-end push, so it's easy to drive through both tight and sweeping corners. As a bonus, the heavy-duty nylon uprights replace the stock JR-X2 uprights, and they work with the stock JR-X2 suspension. No. B-200. Price: \$30/complete kit.

For more information, contact Lunsford Racing, 619 First Ave. E., Albany, OR 97321.



KYOSHO Servo-Saver

Kyosho has developed a new servo-saver to reduce steering slop and to provide more precise in steering response. Designed for the Optima and Ultima Series cars, this new servo-saver is a must for competition-level drivers. Four 5x8mm ball bearings (not included) are largely responsible for a cleaner, stiffer steering response. Price: \$4.10 (without bearings).

For more information, contact Great Planes Model Distributors, P.O. Box 4021, Champaign, IL 61820.



TEAM ASTRO DC Peak Charger

Team Astro's model 110 DC Peak Charger can charge 4 to 12 cells from 12 volts, using an internal AC/DC switching converter. A constant 4.5-amp charge rate allows the amperage to stay constant, even when there's a drain on the electrical source. Other features include: Charge capability with 450mAh to 1700mAh cells; fuse and diode protection, which prevents damage even when the 12V input is connected in reverse; short-circuit protection; and supercharging capability for competition racing. Price: \$99.95.

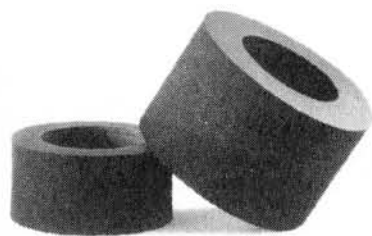
For more information, contact Astro Flight, 13311 Beach Ave., Marina Del Rey, CA 90292.



PARMA BBS Wheels

Parma's new, reliable, BBS, low-profile wheels improve stability on turns. The blue or green rubber compounds have just the right amount of "bite," and this makes these mounted and trued tires perfect for asphalt or carpeted tracks. Price: \$15/pair (front); \$18/pair (rear).

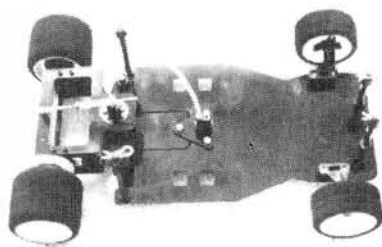
For more information, contact: Parma International, Inc., 13927 Progress Pkwy., North Royalton, OH 44133.



PARAGON New Compound Tires

Paragon announces PD Positraks, the revolutionary competition tire of the '90s for the serious on-road racer! Made possible through advances in rubber compounding, PD Positraks allow more throttle into and out of corners without scrubbing battery power. This single compound works well on all surfaces and lasts up to 75 percent longer than conventional tires. PD Positraks are now available in 1/12 sizes with 1/10 sizes coming soon. 1/12 part no. RD014 (Rear) and no. FD014 (Front). Price: \$9.95 a pair. Send \$2 for the new Paragon catalogue.

For more information, contact Paragon Racing Products, Dept. CA2, 690 Industrial Circle So., Shakopee, MN 55379.



C&M MFG. Cobra Sport

Cobra Sport is the first, competitive, entry-level, 1/10-scale road car with the same winning chassis design as Cobra Race Cars. The Sport accepts stick and saddle-pack batteries and it features: easy assembly; ball differential for Losi or Kimbrough gears, four-way rear-pod adjustment; and a sprung front end. Available in black or white fiberglass, it's easily upgraded to a Cobra Race Car. Price: \$119.95.

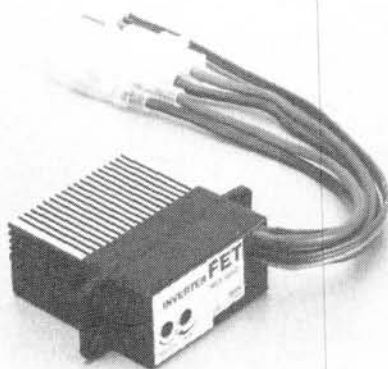
For more information, contact Team Cobra, C&M Mfg., P.O. Box 701353, West Valley City, UT 84170.



BOCA BEARING RC10 Bearings

Boca Bearing Co. is introducing RC10 bearing kits with new, exclusive "Ultra Seals." These bearings contain a new, frictionless seal that will increase your bearing life and reduce costly maintenance. After 12 consecutive race days, the bearings were removed and inspected, and there was no sign of dirt or wear. Several track records have been set in 2WD stock and modified oval by racers using these bearings. They're also available for any other R/C car that uses standard SAE measurements. No. 05-10US for RC10. Price: \$99.95.

For more information, contact Boca Bearing Co., 7040 W. Palmetto Park Rd., Suite 2304, Boca Raton, FL 33433.



JR 950 Speed Controller

The JR 950 Speed Controller without reverse is a state-of-the-art, competition speed control that offers better performance and increased reliability. Its power Mosfet provides full voltage with almost no voltage loss from the Ni-Cds to the motor. The 950 fits into a standard servo

mount, and it has forward speed only (no reverse) and overload protection. It features a new RF switching system for smoother motor control, a forward and brake-monitor LED, forward and brake high-point monitor LED for set-up adjustment, and a built-in heat sink. Its voltage regulator supplies power to the receiver and servos. A separate receiver battery isn't necessary, but one can be used. No. JRA950: FET Control system 7.2V—9.6V (without reverse); continuous current, 40 amps/forward; surge current, 1440 amps/forward; residual resistance, 0.0025/forward. Price: \$124.99.

For more information, contact Hobby Dynamics, 4105 Fieldstone, Champaign, IL 61820.



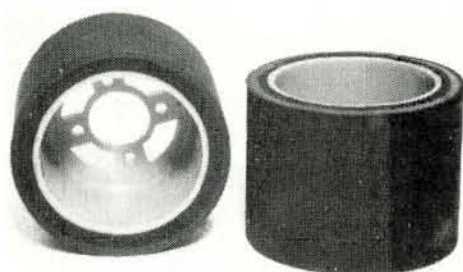
NERON Antenna Coil Core

Neron's new Dyna-Coil will help improve radio reception and will eliminate the "glitches" caused by having to wind the excess receiver antenna wire around itself to make it fit inside R/C vehicles. By coiling the excess wire between the mast base and the receiver and then onto the Dyna-Coil, the original antenna length is maintained, reception is improved and control is more positive. With the Dyna-Coil, equipment is protected against damage caused by antenna wire being tangled in moving parts. Part No. 14. Price: \$1.25 for a pack of three.

For more information, contact Neron Associates, P.O. Box 348, Germantown, MD 20874.

WHAT'S NEW

Descriptions of new products appearing on these pages were derived from press releases supplied by the manufacturers and/or their advertising agencies. The information given here does not constitute endorsement by **Radio Control Car Action**, nor guarantee product performance or safety. When writing to the manufacturer about any product described here, be sure to mention that you read about it in **Radio Control Car Action**.



SPACE AGE TECHNOLOGY Rubber Racing Tire

Space Age Technology now produces a unique, molded, rubber-on-foam racing tire. Foam-and-rubber molding technology is used to apply layers of foam and rubber to SAT wheels. The completed product is the lightest rubber tire on the market. The wheel run-out is .005 or less, and, with the adapter added, the run-out is .007 or less. If you use SAT's lightweight bearing hub adapter, there's no need to tamper with bearings, and you can run all widths of SAT tires on the front or rear. To vary offset, the racer can turn any wheel or adapter around. Because of the unique manufacturing process, no "break-in" is required for these tires, and "scuffing-in" is all that's needed for each car. Price: Wheels, \$5/pair; adapters, \$1.80/pair; tires, \$37.50/pair.

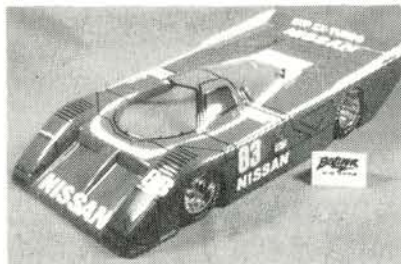
For more information, contact Remote Hobby Inc., 9005-C Two Notch Road, Columbia, SC 29223.



TWINN-K Nut-Driver Sets

Attention drivers! Tired of looking for the right tool? Get organized! Twinn-K now offers Nut Driver Sets in two styles. Ask for: no. 0175, Standard 7-piece Nut Driver Set, $\frac{3}{16}$, $\frac{1}{4}$, $\frac{5}{16}$, $\frac{11}{32}$, $\frac{7}{16}$ and $\frac{1}{2}$ inch; no. 0176, Metric 7-piece Nut-Driver Set, 5, 6, 7, 8, 9, 10 and 11mm. Price: \$11.99.

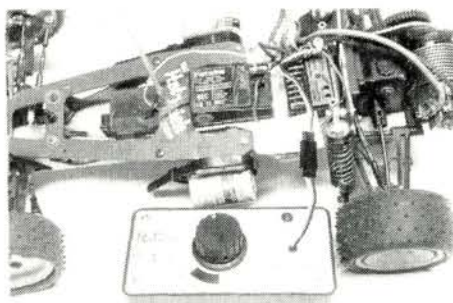
For more information, contact Twinn-K Inc., P.O. Box 31228, Indianapolis, IN 46231.



BOLINK Nissan GTP Body

Bolink's new Nissan GTP Coupe will be as popular as the full-size GT Prototype that won many of the IMSA races in '88. Its superior aerodynamic qualities will improve the handling of any $\frac{1}{10}$ -scale road-racing car. No. BL-2352 Nissan GTP Coupe. Price: \$18

For more information, contact Bolink R/C Cars, Inc., 420 Hosea Rd., Lawrenceville, GA 30245.



RIST RACING Pit Stop Radio

Are you tired of being trapped in the pits at a big race with your transmitter impounded and with no way of testing your car's speed controller or steering servo? What you need is a Pit Stop Radio that operates on a 9V battery, fits inside your toolbox and operates any electronic speed controller or steering servo. Simply unplug a speed controller or servo from your receiver and plug it into the receiver connector on the Pit Stop Radio. Now you can operate the speed controller or servo with the knob on the Pit Stop Radio. This radio also comes with a choice of receiver connectors and complete calibration instructions, so you can match it to your car's radio system. No. PSR-1. Price: \$29.95.

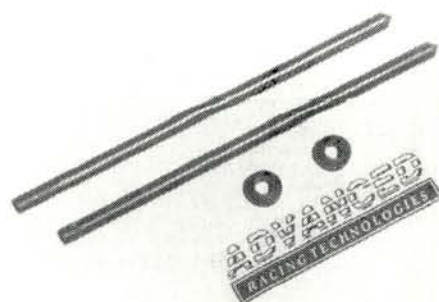
For more information, contact Rist Racing, 3712 Pecan Grove Dr., Huntsville, AL 35810.



CMW Speed Controls

CMW proudly presents its full line of Tempfet speed controls. Tempfet provides extra protection from speed-control burn-out. Cool-running "Active Current Pump Circuitry" allows more power to reach your motor, and this provides more acceleration punch. A double-sided PC board is used for more efficiency, and each controller features super-smooth low-end control, plus dynamic braking. Low voltage drop helps keep the "peak" in your batteries when you're sitting at the starting line, and low-voltage protection prevents runaways when your batteries run low. Price: \$89.95 to \$139.95.

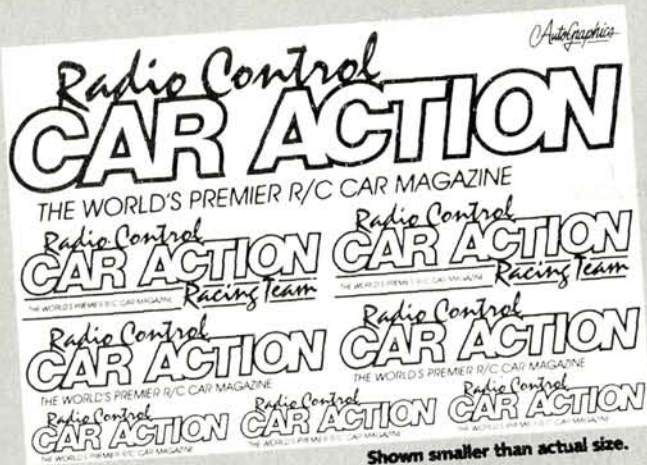
For more information, contact CMW International, 717 Simundson Dr., Suite 536, Point Roberts, WA 98281.



ADVANCED RACING TECH 6-inch Body Posts

Advanced's super-strong 6-inch body posts (no. 2096) are necessities for mounting stock-car bodies on on-road cars. These body posts with setscrew collars are just the thing to make a clean, fully adjustable, mounting system. Eliminate the spacers necessary with shorter posts. Price: \$6/pair.

For more information, contact Advanced Racing Technologies, 460 Cypress Lane., Suite F, El Cajon, CA 92020



R/C Car Action Decals!

By popular demand we now have 4"x6" sheets of assorted Car Action Decals for your R/C Car. These high quality pressure sensitive decal sheets come in 5 different colors: Black, Red, White, Gold and Blue. Each Color sheet is \$2.00 and this includes postage & Handling. Send check to:

**R/C Car Action Decals,
251 Danbury Road, Wilton, CT 06897**

Shown smaller than actual size.

MOTOR CONDITIONER

(Continued from page 200)

in a direction that's opposite to the rotation of the motor (usually counterclockwise).

You can also use the Motor Conditioner to re-set the timing on a motor that you want to run in reverse. Some direct-drive systems and some two-motor trucks require motors that run in reverse. With the Motor Conditioner, it's as simple as reversing the polarity of the motor leads on the motor and establishing the new zero

timing point. Be careful: Always mark the factory setting before you loosen the end bell on a motor, because this is usually the best setting for the timing.

The condition meter. This does work, but, like all the other condition meters I've used, the results are vague. If you look at this reading along with the rpm and current readings, however, a very good picture of a motor's overall condition can be determined. The major problems that plague a motor are burnt or pitted armatures, worn brushes and poor bearings. By noting the reading on the condition meter

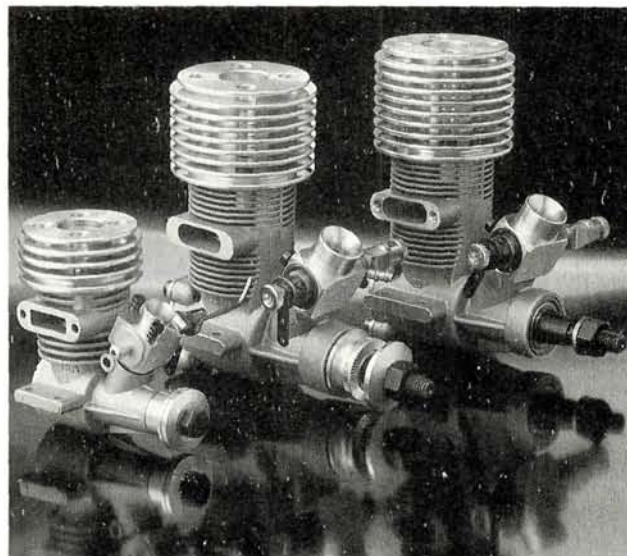
when the motor is in good working order, a problem in the motor can be detected by watching for changes in the meter reading.

To use the condition meter, you just observe the position of the needle. A motor that's in good condition will cause the meter needle to swing to the left (toward the red end of the scale), and it will give a steady reading. A problem is indicated if the reading isn't far enough to the left, or if the needle is oscillating wildly. Under these conditions, you should check

(Continued on page 206)



Car & Buggy Engines



MINIATURE MUSCLE

Three new additions to the Webra engine line up for 1989 include the Sport .10, Speed .20 ABC and Speed .28 ABC Car and Buggy engines for 1/10th and 1/8th scale cars. The Sport .10 is a great choice for those who want to get their feet wet in gas powered, on or off road. The Speed .20 and .28 are breaking new ground and turning heads with their high torque, incredible power, maintenance free operation and unsurpassed performance.

#WE1006CAR Sport .10 Car/Buggy

#WE1018CAR Speed .20 ABC Car/Buggy

#WE1029RCB Speed .28 ABC Buggy

Webra Engine	Output HP	RPM-Range RPM/mon.	Displacement ccm	Bore mm	Stroke mm	Weight oz
.10 Sport	.30	2500-17000	1.6	13.0	12.0	3.46
.10 Speedy	.50	2500-24000	2.0	14.2	12.5	4.76
.20 Speed ABC	.95	2500-18000	3.42	16.5	16.0	7.58

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MOTOR CONDITIONER

(Continued from page 205)

the brushes, the brush springs and the brush holders for proper alignment and operation. Have the armature turned, if necessary. The problem can sometimes be corrected by breaking-in the motor.

Summary: Aristo-Craft's Motor Conditioner is a very useful tool. The 10-page, detailed instruction book discusses its use and gives many valuable tips on motor care. The rpm current-meter method described in the manual works well. The tachometer and the ammeter work best; in fact, they work so well that I couldn't imagine another racing season without my Motor Conditioner.

The Conditioner is also very useful when you're breaking-in a motor, because it allows you to run the motor at a reduced voltage while using a standard 6- or 7-cell battery pack. Long break-in runs do require several battery packs to get the job done, but this could be an advantage, because while the battery pack is recharging, you can clean and re-lubricate the motor. I'm convinced that excessively long break-in runs do more harm than good because the bearings run dry and are consequently damaged.

The timing-point meter is a washout because the deflection of the needle is too slight to give an accurate timing setting. The Condition Meter works better than the timing-point meter, but you still have to rely heavily on the tachometer and ammeter readings to determine the motor's overall condition.

With the Aristo-Craft Motor Conditioner, you'll really get a feel for your motor's performance, and if you're serious about your racing, you'll find this equipment very useful.

*Here's the address of the company featured in this article:
Aristo-Craft/Polk's, 346 Bergen Ave., Jersey City, NJ 07304

PROJECT SPRINTER

(Continued from page 183)

they're parallel to the ground (i.e., sticking straight out to the side). Holes are then drilled through the body so that it can fit over the mounts and be secured with body pins. With these mounts, the body always goes on the car in the same way, and it won't come off, as it can with Velcro. I also used JG's Kydex front sprint-car bumper and receiver/speed-control mount.

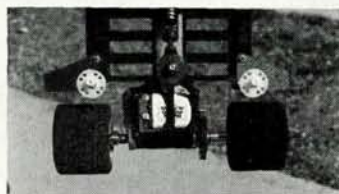
I chose a McAllister Racing* Silver

(Continued on page 210)



Manufacturer of the
Finest Innovative and
Functional R.C.
Equipment.

NEW FOR
1990



10L NARROW REAR END

This Rear End Kit for the Associated 10L Car centers the motor on the chassis, narrow rear end track to reduce front end push. Protects rear axle from impacts. Comes with "Threaded Center Post" for precision dampening adjustments that won't "slip". Upper and lower braces are made of graphite. T-Bar and T-Bar spacer are G-10. Nothing more to buy, uses all standard 10L parts in kit.

Part # PS01.....\$49.99
Spare Threaded Center Posts available separately.
Part # PS02.....\$ 6.50

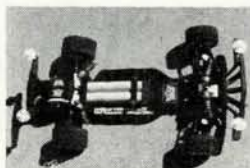


RC-10 GRAPHITE LOWERING KIT

This is the new lowering kit for the new Associated RC-10 Graphite Kit with long suspension arms. Made of precision molded nylon and graphite materials, it lowers the car's center of gravity while laying the shocks down to allow the use of wedge bodies without the need to cut holes for shock clearance. Front outer shock mounts are of composite graphite for strength and durability. Hardware included.

Part # 2026.....\$24.99
Spare Outer Front Shock Mounts available separately
Part # 2027.....\$12.95 pair

Inquires Welcome



For Latest Catalog Send: \$1.50 plus SASE, size 4" x 9"

CHEETAH RACING, 10823 Amestoy Ave., Granada Hills, CA 91344 (818) 366-2683

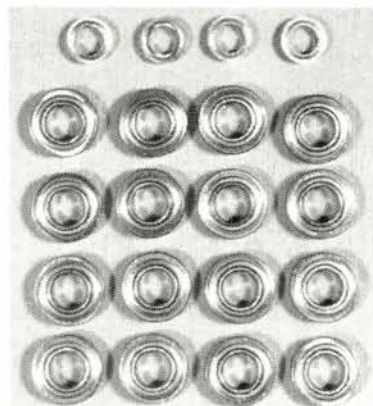
WHAT'S NEW



HOBBICO Bullet Glues

Hobbico is pleased to announce a new line of specially formulated CA, that's only for hobby use. This thoroughly tested and proven glue works well with porous materials (such as balsa) and non-porous materials (fiberglass, plastic, etc.). Bullet glue is available in thick and thin formulations and in 1- or 2-ounce bottles. Bullet Activator, which speeds up the curing time of all CAs, and Bullet Debonder, which dissolves all CA glues, are in the Hobbico Bullet glue line. No. HCAR3500, 1-ounce bottle, \$4.59; No. HCAR 3600, 2-ounce bottle, \$8.49.

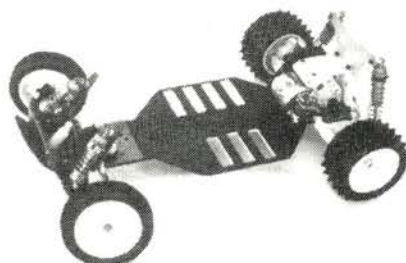
For more information, contact Great Planes Model Distributors, P.O. Box 4021, Champaign, IL 61820.



AEROTREND Clod Buster Bearing Kit

Because of the size and weight of the Tamiya Clod Buster, bearings are essential for improved performance. Aerotrend offers a complete 20-piece stainless-steel shielded bearing kit, which includes the four small bearings for the transmission. No. 4227. Price: \$69.99.

For more information, contact Aerotrend, Nichols St., Ansonia, CT 06401.



RC INNOVATORS RC10 Conversion

RC Innovators, a new R/C after-market design and manufacturing company, announces its first product: the mid-engine conversion kit for the Associated RC10 car. Mids typically offer quicker response when cornering, improved weight distribution, and better handling. The conversion kit includes a lightweight carbon-fiber graphite or fiberglass chassis, aluminum motor plate and instructions. Precision-machining from CAD design is used for a quality product. Because of its improved design, there's no need to run the motor backwards, as in other conversions. Saddle-pack battery slots are cut in two vertical rows (three on one side and four on the other) to allow space for a 7-cell pack, if desired. A conversion kit for the JR-X2 is currently in the design phase at RC Innovators, as are trailing arms for both conversion kits. Price: \$29 for fiberglass kit; \$59 for graphite kit.

For more information, contact RC Innovators, 2914 Dovenshire Dr., Tracy, CA 95376.



BULLET RACING Belt-Drive Transmission

Bullet's new, belt-drive, gear-diff transmission brings the best to R/C racing. Completely adjustable slipper clutch makes last-minute trackside adjustments easy. Part no. 5000. Price: \$129.95.

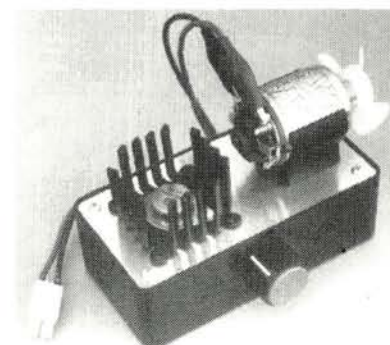
For more information, contact Bullet Racing Products, Inc., 14435 Tomball Parkway, Houston, TX 77086.



BOXES PLUS Hobby Box

Can't locate tools, accessories and spare parts when you need them? Get it all together with a DB-6D hobby box from Boxes Plus. Whether you keep it on your workbench or take it to the field, the DB-6D is the ultimate hobby organizer. The 5-inch-deep top compartment can hold most 1/10-scale off-road and on-road cars. The six drawers come in three sizes for organizing tools, equipment and spare parts. The DB-6D comes fully assembled pre-sanded and ready for the finish of your choice. Match it to your hobby colors. Overall dimensions are 22x10 1/2 x 17 inches. Price: \$89.95.

For more information, contact BP Industries, P.O. Box 521, Hubbard, OH 97032.



AMERICAN MFG. Motor Break-in Machine

American Manufacturing introduces its Motor Break-In and Reconditioning Machine. Engineered for the serious competitive racer, this new unit incorporates a unique built-in motor holder, slip on cooling fan, full-scale voltage adjustment (down to .5V DC) and dual-power mode. The Motor Break-In Machine uses 6- to 7-cell packs or the optional A power module.

For more information, contact American Manufacturing, 1222 E. Eichel Ave Evansville, IN 47711.

PROJECT SPRINTER

(Continued from page 206)

Bullet Sprint Car for the body. The fuel cell is held on with a piece of an old 12E front bumper and a large body post. The bumper was cut so that it extends from the rear bulkhead, and it rests on top of the transmission.

I also used the Track Master* Turbo Glide belt-drive transmission. It's the one that I've been using for several months, and I've had great results with it. It pro-

vides smooth acceleration, and it needs little maintenance. Because it's quiet, I can hear the way the motor is winding out, so I can judge motor efficiency and make gear choices.

Speaking of gear choices, I used Robinson Racing* 48-pitch gears. They run very true, and there's a variety of larger spur gear sizes available. To make quick and easy battery changes, I used the Cheetah Racing* Quick Change battery system, which eliminates messy wires and connectors (see sidebar).

The track where I'm currently racing

requires all racers to use the Advance Engineering* 1/8-scale wheels and tires. The front wheels are 1.375 inches wide with a diameter of 2.125 inches, and the rears are a whopping 2.5x2.125 inches! These wide wheels and the authentic-looking treaded tires give a true, scale appearance. For show purposes, I use the aluminum eight-hole Mini-Mags from Advance, but for serious racing, I use Advance's nylon wheels. To eliminate tire bounce, I drilled two small holes in each nylon wheel to allow the air to escape. To attach the tires to the wheels, I used Loctite's* Black Max, which is a black, flexible CA that works like magic and blends with the tire's color.

The one drawback to using oversize tires is mangled dogbones. The weight of the tires, combined with the brutal force of a Twister* stock motor and 7-cell SCR pack relayed by a Tekin* 300 speed control, puts an awful strain on those little pieces of metal.

To solve the problem, I turned to Bullet Racing Products*, the makers of very beefy telescopic universal shafts. They seem to stand up to the abuse, and they're more efficient than standard dogbones. Bullet makes adapters to replace the out-pup cups for MIP, J-Car and Ultima trans-

(Continued on page 214)

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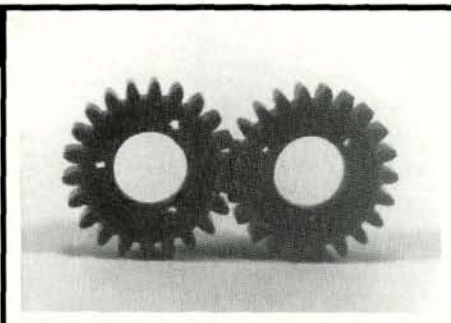
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PROJECT SPRINTER

(Continued from page 210)

missions, but because the Track Master tranny has a large output shaft, I thought that I was out of luck. Wrong! Bullet also

makes an adapter to fit in the output cups of the stock RC10 tranny. The adapters fit into the cups and are bolted into place by using the slot for the dogbone pins. Because the Track Master tranny is wider than the stock tranny, to prevent binding,

the inner and outer shafts had to be trimmed down.

PERFORMANCE: Wow, what fun! I've never raced a sprint car before, but now I'm hooked. My Project Sprinter performed admirably—much better than the driver! While I have a fair amount of dirt-oval racing under my belt, driving one of these top-heavy beasts is something else.

I originally had trouble with the back end of the car dragging on the track, and I found that the Associated front shocks I had on the rear were shorter than the DuraTrax* shocks I had on the front. I swapped the two sets of shocks, and the bottoming problem was cured. Gold springs with Team Losi* 30WT shock oil all around gave the car neutral handling.

All the components of this project car worked as expected. Of special note is the fact that the aluminum construction of the chassis from Sassy Chassis proved to be much stiffer than the kit's fiberglass chassis. While it does flex a little, breaking it isn't a concern, nor is tweaking.

If you want no-holds-barred racing action without risking your neck, try making your own Project Sprinter!

**Here are the addresses of the companies mentioned in this article:*

RCRC, 18240 S. Vermont Ave., Gardena, CA 90247

(Continued on page 218)



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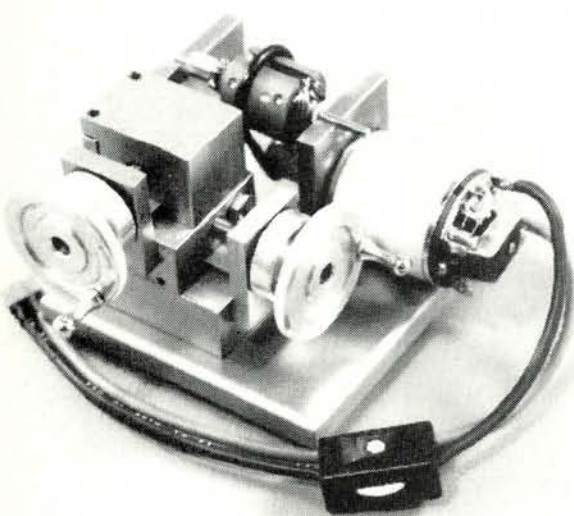
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(Continued from page 214)

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Robinson Racing Products, 501 Peach, Santa Ana, CA 92704.

Cheetah Racing, 10823 Amestoy Ave., Granada Hills, CA 91344.

Advance Engineering, P.O. Box 766, Woodland Park, CO 80866.

Loctite Corp., 4450 Cranwood Ct., Cleveland, OH 44128.

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Tekin Electronics, 970 Calle Negocio, San Clemente, CA 92672.

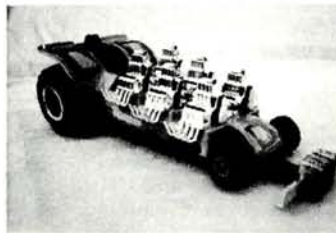
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In keeping with our constant efforts to help foster the growth of the radio-control car hobby, we've decided to run this track directory intermittently to inform modelers where they can race and exchange ideas. If you'd like your track listed, send us your name, address, phone number and some information about the track to **R/C C: Action Track Directory**, 251 Danbury Road, Wilton, CT 06897. We'll list as many clubs as space allows.

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(Continued on page 223)

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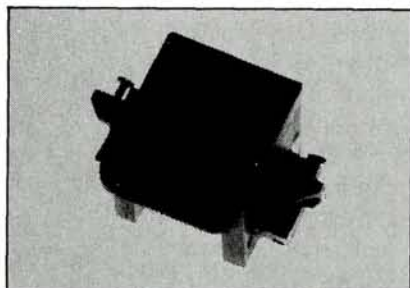
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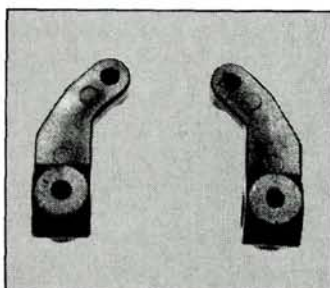
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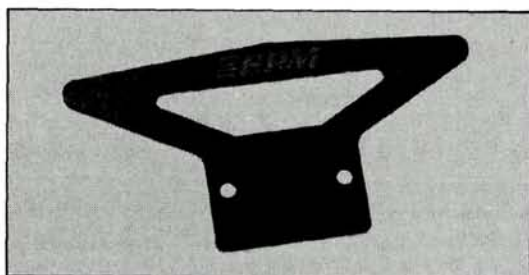
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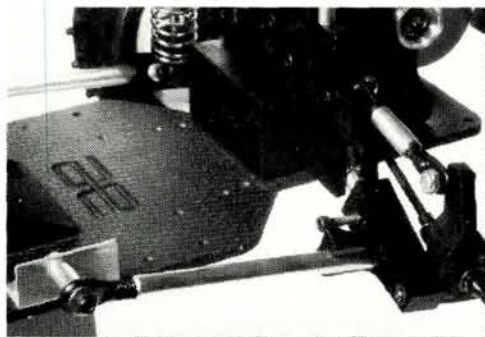
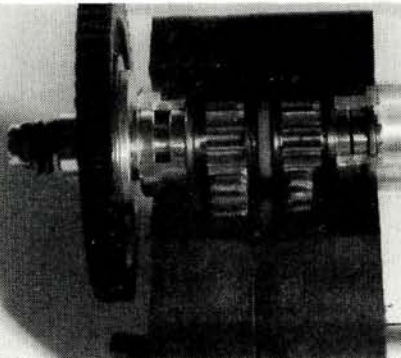
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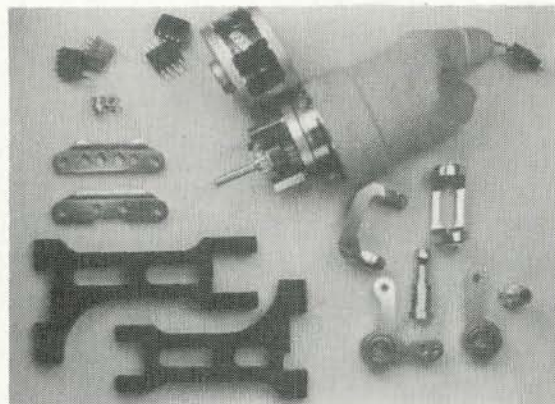
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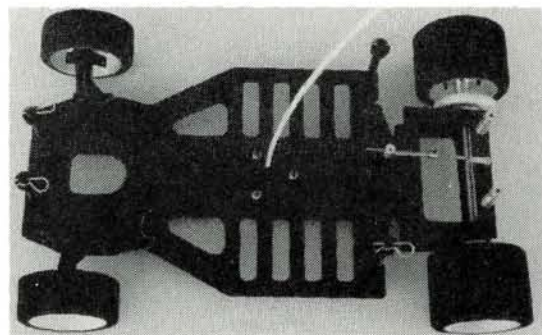
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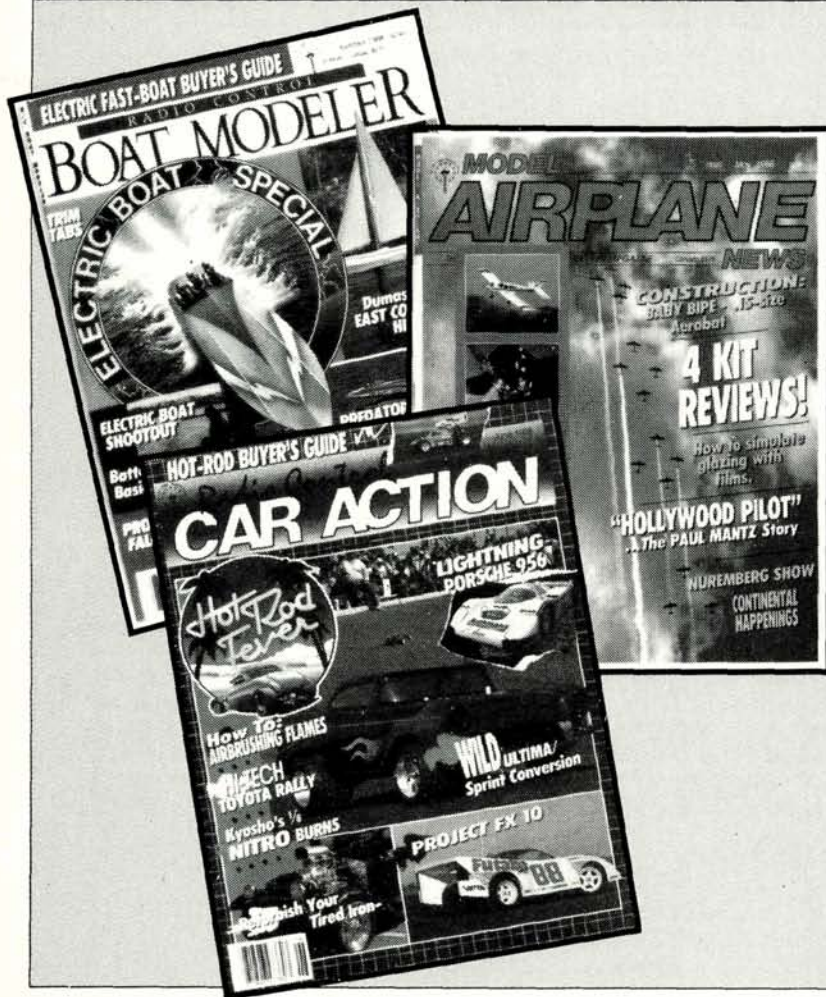
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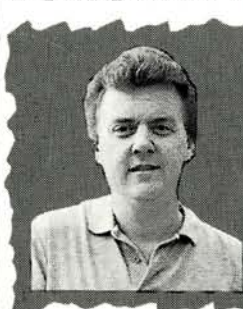
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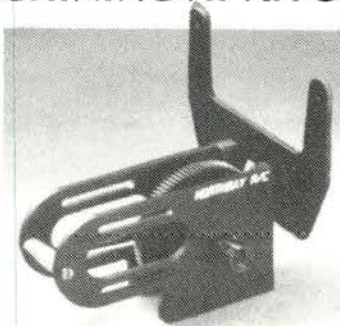
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